Pacific Marine Review

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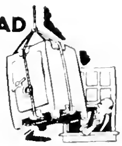

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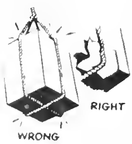

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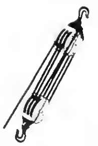

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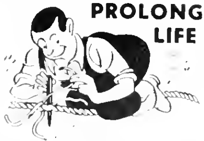

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Pacific Marine Review

Our Cover

On our cover this month is an artistic picture showing one of the flat-tops (airplane carriers) from the Vancouver, Washington, yard of Kaiser Co., Inc. May this ship and her mates carry defeat to the enemies of freedom in 1944.

Member Audit Bureau of Circulations

Official Organ

Pacific American Steamship Association

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Shipowners Association of the Pacific Coast

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Pacific Marine Review

Pacific Coast Shipbuilding

Five years ago the Pacific Coast was a negligible factor in the merchant shipbuilding of the United States.

Four years ago the Pacific Coast had a few merchant vessels under construction.

Three years ago the Pacific Coast was building some new shipyards.

Two years ago the Pacific Coast was beginning to deliver ships of the Liberty type.

A year ago the Pacific Coast was attracting the attention of the shipbuilding world by the spectacular feats of its shipyards.

Today the Pacific Coast is the shipbuilding center of the world in war types of merchant ships.

This unprecedented growth in a specialized type of industry has brought tremendous problems in many related fields, such as the construction and equipment of manufacturing plants for ship machinery; the recruitment, training, housing and feeding of a multitude of workers; the subcontracting of various items in ship construction and equipment; the recruitment and training of an army of ship-operating personnel; and the organization of large technical staffs for detail design.

Three shipyards of the Pacific Coast have each delivered during the past two years over 3,000,000 deadweight tons of merchant steamers. In each of these yards over 2,000,000 deadweight tons of this total was delivered during 1943.

On the Maritime Commission program, the Pacific Coast yards have delivered, during 1943, a total of over 900 ships of 2000 gross tons or over. This is better than an average of one ship delivered every 10 hours night and day throughout the year.

In addition to this amazing record, the shipyards of the Pacific Coast have produced many fighting craft and thousands of auxiliary Navy craft and miscellaneous small craft for the U. S. Navy, the U. S. Army and the U. S. Maritime Commission.

This number of "Pacific Marine Review" presents in text and illustration some of the details of this great 1943 shipbuilding effort.

These figures look quite simple as set forth in the above paragraphs, but very soberly and with careful consideration for the full meaning of the words these figures represent the greatest industrial effort in American history. That this effort was successful in meeting the greatest need for ships in the world's history is amply attested in the victories won by our armed forces during 1943.

Credit for the accomplishments of Pacific Coast shipyards in this war effort goes first of all to the U. S. Maritime Commission and its dynamic admirals, Emory S. Land and H. L. Vickery. These two men have the responsibility for the total shipbuilding effort of the nation, and they have exercised that responsibility not only with impartial firmness according to the regulations but with very unusual common sense.

The Pacific Coast Regional Construction Office is directly responsible for the work at Pacific Coast shipyards. Here Carl W. Flesher is in charge, and has carried on in the same spirit that animates his chiefs at Washington.

Among the heads of the shipyards, certain names have attained world renown, such as: Henry J. Kaiser and his son Edgar, of the Oregon Shipbuilding Corporation, the Permanente Metals Corp., and the Kaiser Co., Inc.; S. D. Bechtel of California Shipbuilding Corporation, and his brother K. K. Bechtel of Marinship Corporation; Alden G. Roach of Consolidated Steel Corporation, Ltd.; Joseph A. Moore and his two sons, Joseph A., Jr., and James R., of the Moore Dry Dock Co.; A. S. Gunn of the Shipbuilding Division of the Bethlehem Steel Company, Inc., Pacific Coast yards; R. J. Lamont of the Seattle-Tacoma Shipbuilding Corporation and Todd Seattle Dry Docks; and Howard Tallerday of Western Pipe and Steel Co.

Under these leaders, thousands of craftsmen, leadermen, foremen, superintendents, inspectors and executives have combined their efforts to meet production schedules while building the plant, training green hands, organizing purchasing and expediting departments and creating new methods and machinery for speeding up the work. Men and women from every trade and from every walk of life have been trained as: shipfitters, welders, burners, draftsmen, loftsmen, shipjoiners, pipefitters, tackers, caulkers, machinists, riggers, crane operators, and the many other crafts that go into the fabrication, assembly, erection and outfitting of a ship.

Each of three shipyards has fabricated and erected over a million tons of ship steel into the hulls of Liberty ships. All of this steel came by rail from the great steel mills of the Middle West, with the exception of a few tons in recent months from Kaiser's newly opened steel mill at Fontana, California.

The "Victory" Stern

One of the interesting features of the hull of the U. S. Maritime Commission designed Victory cargo steamer is the run of the stern, which is molded into contra-propeller curves above and below the stern tube. So far as we know this is the first hull design using this now well-known and widely used aid to propeller efficiency as a part of the hull lines. Theoretically it should work very well. In a month or two, the trials of the first "Victory" type steamer will have been run and we shall know the practical results.

The contra-propeller has been much in use in recent years, and many steamship owners have paid handsome royalties to its inventors. Knowing this, we were somewhat surprised to find this device, "an aid to propeller efficiency," described perfectly in the 1863 proceedings of the Institution of Naval Architects, London.

At that time the propeller was in bad repute. Cunard Steamship Company had tried it out on transatlantic runs and changed back to paddle wheels. Professor Rankine of Glasgow University, and David Napier of Glasgow, presented a short paper with drawings showing the contra-propeller principle applied to the rudder post aft of a single screw and mathematically proved its great advantage. However, they were very politely but effectively ruled out in discussion by Scott Russell and Isadore Brunel, then the leaders in the I. N. A. So this excellent idea lay dormant until it was revived by German naval architects over 50 years later.

Now, in the Victory model, the idea has reached its ultimate perfection by being molded into the basic design of the hull.

Refrigerated Ship Service Announced

According to an address made by William K. Jackson, vice president and general counsel of the United Fruit Company, before the San Francisco Chamber of Commerce and the San Francisco Commercial Club on December 8, 1943, the United Fruit Company will play its full part in building up and enlarging the American Merchant Marine by the establishment of new trade routes served by American flag ships.

The company has decided to establish a regular weekly service with large, modern, fully refrigerated vessels from the West Coast of the United States to Great Britain and Europe. Six of these vessels are now being constructed in one of our American shipyards, and are expected to be completed during the last half of the year. Each ship will have about 300,000 cubic feet of refrigerated cargo space. They are to be fast ships, with a speed of over 18 knots. Of course, if the war is still going on when they are completed, it is highly probable that these ships will be needed for transporting food to our armed forces and they will undoubtedly be taken over by the Government. This would delay the institution of the new service. If the ships are not taken by the Government, the company expects to start this new service as soon as possible after the delivery of the ships by the builders and as soon as trade with Europe can be resumed. The maintenance of a weekly service will probably require nine vessels, and until three additional vessels can be built it may be necessary to fill in with units from the present refrigerated fleet of the company. It is the company's intention to maintain this regular dependable service on the basis of a weekly departure from the West Coast. This will enable the fruit growers of the West Coast to ship their fruit to England and Europe on regular scheduled sailings. Before the war this service was rendered wholly by foreign flag vessels and upon an irregular schedule.

The foreign flag fleet in this service consisted of some 65 vessels, either fully or partially refrigerated, and while it is not known how many of these vessels have been destroyed, a goodly number must still be afloat and will undoubtedly return when the war is over. The proposed new service with American flag ships marks a modest beginning, and should contribute to the early restoration of a business which affords a desirable outlet for the products of the Pacific Coast.

It is apparent that a regular weekly dependable service will be of inestimable value to the fruit growers and the business interests of the whole Pacific Coast. These ships on both their outbound and inbound voyages will also be used to develop trade and commerce between the Pacific Coast of the United States and the increasingly important and fast-growing countries of Middle America.

This is a practical example of what can be done to establish new and essential trade routes for our merchant marine.

Navy Needs Oil Terminal Supervisors

The Navy is in urgent need of officers to serve as oil terminal supervisors. These officers, because of the extensive specialized experience required of a man in order to be qualified to handle the duties, must of necessity be procured from civilian life. Such officers, when commissioned, will be assigned to duties both within and beyond the continental limits in connection with the handling of all types of fuels, including the loading and unloading of tankers, tank cars and barges, and the supervision of storage facilities.

In order to be qualified a man must have had five years' experience in the handling of bulk fuel oil, including two years in a water terminal storage plant in a supervisory capacity. Candidates must be familiar with the loading and unloading of large ocean-going tankers, and it is desirable that they know specifications for gasoline, fuel oil, lubricants and aircraft engine oil. Age limits are 30 to 50 years, and qualified applicants will be commissioned in ranks ranging

from Lieutenant (jg) through Lieutenant Commander, depending primarily upon age.

Men who are interested can make application or obtain further information at their nearest Office of Naval Officer Procurement. There are offices located at 411 West Fifth Street, Los Angeles 13, California; Bank of America Building, 615 Broadway Street, San Diego, California; Central Tower Building, 703 Market Street, San Francisco, California; and 117 Marion Street, Seattle, Washington.

Errata

In the middle of the last paragraph, page 108-D, November issue, appeared an erroneous statement in regard to the capacity of the Breidert Air-X-Hauster. As there printed, the sentence reads: "The average velocity of air sucked out through the throat ranged from 175 fpm with the breeze blowing 10 mph." The latter part of this sentence should read: "675 fpm with the breeze blowing 10 mph."

Our apologies to Breidert for this unintentional understatement of the capacity of his very efficient ventilating device.

Logistics of Global War

Webster defines "logistics" as "That branch of the military art which embraces the details of the transport quartering and supply of troops." Engaged in a world-wide war, we are learning a lot about the tremendous job which is involved in Global Logistics.

War Shipping Administration, the Army and the Navy are doing an almost superhuman job in keeping the supplies flowing smoothly to fighting fronts on five continents over some of the longest water routes on the face of the globe and against submarine activities of a devilishly clever enemy.

The transport of the equipment and initial supplies for one armored division requires 15 Liberty cargo carriers. Thereafter this division requires the arrival of a fully loaded Liberty ship every eight days.

Looking at it in another way, each man in our overseas forces requires the transport of one ton of supplies each month. A general average for round voyages in this war is four months or more traveling in convoy. There are considerably better than 2,000,000 men in the armed forces overseas, and that number is growing rapidly. Taking 2,500,000 deadweight tons of ships as a minimum monthly arrival, we need a total of 10,000,000 deadweight tons in constant operation for the supply of the United States Armed Forces in the overseas war areas.

A consideration of the allocation of tonnage by the War Shipping Administration in recent months shows roughly: "Army 37 per cent, Navy 11 per cent, Lend-Lease 37 per cent, others 15 per cent. Applying these percentages to the 10,000,000 deadweight tons above, it is evident that present need for overseas transport of foreign trade, Lend-Lease and military requirements indicates a minimum of 21,000,000 deadweight tons.

During the past year America's new merchant fleet, manned for the most part by rather green hands, has accomplished a tremendous military task—a task greater than any performance of any national merchant marine in the world's history.

The experience gained in the prosecution of this task should be of inestimable value in the maintenance of American international commerce when peace has been established. If we can harness to this experience the interest in foreign lands and foreign products that has been planted by this war in the minds and hearts of millions of American citizens, then the future of American international trade should be secure.

A Notable Safety Record

During the months of September and October, 1943, the San Francisco Port of Embarkation was the leading port of the nation from the standpoint of safety and accident prevention.

In September the accident frequency rate among civilian employees of the port was 7.58 per one million man-hours worked. In October this outstandingly low rate was reduced to 7.32.

Major General Frederick Gilbreath, Commanding General of the Port, deservedly received official congratulations from the Office of the Chief of Transportation, Army Service Forces, Washington, D. C.

Congratulations also are due to the Accident Prevention Bureau of the Waterfront Employers Associations of the Pacific Coast. This bureau for many years has been educating waterfront employees in Pacific Coast ports to think and practice safety while working. This bureau was the first organized safety organization to work on port safety, and is still carrying on its useful and economic work.

Reemployment Rights For Seamen

Reemployment rights for merchant seamen who leave civilian life to serve in the American Merchant Marine are now established by law. This protection for merchant seamen is contained in provisions of an act of Congress (H. R. 131), as follows: ". . . Any person entering service in the merchant marine after May 1, 1940, and before the termination of the unlimited national emergency declared by the President on May 27, 1941, who, in accordance with rules and regulations prescribed by the Administrator, War Shipping Administration, completes a period of substantially continuous service in the merchant marine, shall be entitled to a certificate to that effect from the Administrator upon completion of such period, which shall include a record of any special proficiency or merit obtained. . . ."

In addition the law provides that merchant seamen leaving civilian positions do so on a furlough basis and are entitled to be restored without loss of seniority. It also provides that they may participate in insurance or other benefits offered by the original employer, in effect at the time of their entry into the merchant service. Such seamen cannot be discharged, without reasonable cause, in less than a year after restoration to their original positions.

Admiralty Dean

Ira A. Campbell is practically the dean among American admiralty attorneys. He has been fighting the battle for "Ship-mindedness" in America for 45 years or more. He was one of the first subscribers for and contributors to PACIFIC MARINE REVIEW when this journal was in its infancy in Seattle in 1904.

We have grown up together, and as a magazine representing Pacific Coast ship-owning interests we have been greatly benefited by the many contributions from his shrewd mind and ready pen. We are doubly glad, therefore, to have the privilege of publishing this fine review of a very timely and important subject, which was made at a monthly meeting of the Metropolitan Section of the Society of Naval Architects and Marine Engineers at New York on December 10.

JUST Compensation

THE WORK OF THE PRESIDENT'S

By IRA A. CAMPBELL

ALL AMERICANS have a common interest in the success of the American Merchant Marine. I therefore concluded that I might make some contribution if I could bring to you a clear understanding of one of the most troublesome legal problems that the shipping industry has been facing and still is facing. Its correct determination will mean a strengthening of the industry and the restoration of confidence by ship owners that they will receive justice at the hands of the Government. This is essential to the future success of the American Merchant Marine.

At the time I decided that such a discussion might be timely, the problem was yet under active consideration by the industry and the Advisory Committee of Judges appointed by the President to lay down guiding formulae; rather unexpectedly the Judges have concluded their work, so that I find myself with the problem I intended to discuss largely solved. Nevertheless, I hope that a brief review of it and a consideration of the effects of the determinations of the Judges may still hold some interest for you. Depending upon the spirit of application and administration of the formulae, there can be rough or smooth sailing ahead for the shipping industry.

Simply stated, the question has been:

Basic Questions

What basic principles shall determine the obligation of the Government to pay for the ships, or the use of the ships, which the Government has taken? Shall shipowners be paid for their property taken and used for national defense purposes the same as other citizens are paid for theirs, or are they to be discriminated against through a construction to be placed upon a few enigmatic words introduced into the statute which created the power of requisition?

The Merchant Marine Act, 1936, as amended, provides that: *"whenever the President shall proclaim that the security of the national defense makes it advisable or during any national emergency declared by proclamation of the President, it shall be lawful for the (Maritime) Commission to requisition or purchase any vessel or other water-craft owned by citizens of the United States, or under construction within the United States, or for any period during such emergency, to requisition or charter the use of any such property."*

This power was brought into being by the President's proclaiming a national emergency on May 27, 1941, and by Executive Order, on February 7, 1942, was transferred to the War Shipping Administration.

Between May 27, 1941, and April, 1942, a number of vessels were requisitioned, generally for special War and Navy Department uses. However, up to the time of Pearl Harbor less than 25 large vessels had been requisitioned.

General Requisitioning

As the general war situation continued to grow worse after the national emergency proclamation, the Maritime Commission, and later the War Shipping Administration, had need of the use of many vessels, but these requirements were met by chartering on agreed terms and conditions. By April, 1942, the situation had developed so that requisition of title to some vessels, and a general requisition of the use of all seagoing vessels, was found advisable, and accordingly a general requisition order was issued by War Shipping Administration.

After the general requisition, many charters continued to be executed at rates and with valuations fixed by W.S.A. In many instances, however, the rates of hire and values, or the values alone, were not agreed upon, and were left to be determined by the courts on the basis of just compensation.

In May, 1942, shipowners generally were summoned to Washington by War Shipping Admini-

for Ships

ADVISORY BOARD

stration, and after extended discussion new schedules of rates of hire and values were issued, and although deemed too low by the shipowners, were finally accepted.

Shipowners Cooperate

In all these dealings there was a commendable spirit of cooperation by the shipowners, and they felt that they were making genuine contribution to the war in accepting rates and values under going rates and values. That there was such reduction was enthusiastically claimed by Admiral Land in testimony before Committees of Congress and in a communication to Senator Bailey, Chairman of the Senate Committee on Commerce. It clearly appears from his statements and those of other officials that the authority of Maritime Commission and later of War Shipping Administration under the Ships Warrant Act, was used to drive down rates and values before the power of requisition was exercised.

Notwithstanding these forced reductions, the situation was accepted by the shipowners, and matters proceeded smoothly until the Comptroller General interceded.

Governing Section

Section 902 (a) of the Merchant Marine Act, 1936, as amended, provides that: *"when any such property (vessel) or the use thereof is requisitioned, the owner shall be paid just compensation for the property taken or for the use of such property, but in no case shall the value of the property taken or used be deemed enhanced by the causes necessitating the taking or use."*

Construing these words, *"but in no case shall the value of the property taken or used be deemed enhanced by the causes necessitating the taking* or *use,"* the Comptroller General, in an opinion to Admiral Land, on November 28, 1942, said:

"What are the causes that necessitate the taking or use by the Government of a private vessel? There would appear to be but one answer to that question: The prevalence of a danger or threat to the nation. In other words, it would seem that the conditions under which the power to requisition was to be exercised and the reason or cause which necessitated such exercise of power are but one and the same. Consequently, it seems but a logical step to conclude that the date upon which such conditions came into being must likewise be considered the date when the causes 'necessitating the taking or use' began to exercise their influence on the market value of vessels.

"Furthermore, unless a certain and fixed date be recognized as controlling in this connection, it would appear difficult—if not impossible—to give full effect to the intent of the Congress in fixing the basis on which compensation to be paid owners of private vessels taken over by the Government is to be determined. Hence, it would appear reasonable to conclude that the enhancement clause in said Section 902 (a) prohibits the payment of compensation for such vessels to the extent that it may be based upon values in excess of the values existing on September 8, 1939, provided such excess be determined as due to economic conditions directly caused by the national emergency."

Comptroller General vs. W.S.A.

Thereupon controversy arose between the Comptroller General and War Shipping Administration as to what was the proper measure of compensation to be paid for the requisitioned vessels and their use.

War Shipping Administration stood by the rates and values which it had fixed and agreed to with the owners, as meeting the requirements of just compensation under the law, whereas the Comptroller General strongly intimated that values should be measured as of September 8, 1939, the date of the limited national emergency declared by the President. There was a wide difference in these values, so that the controversy became of vital interest to the shipping industry.

Thereafter War Shipping Administration withheld payment of the full amounts of agreed hire, and of agreed valuations in the case of losses. As stated by counsel for the American Merchant Marine Institute in their recent brief filed with the Advisory Board: *"the overall effect of the Comptroller General's opinion of November 28, 1942, and the action taken thereon by the Administrator, has been to freeze all action by the Administration with respect to purchases, charters, insurance payments, etc., other than the payment of partial hire."*

Fifth Amendment

It has long been settled law that by virtue of the Fifth Amendment to the Constitution, private property cannot be taken for public use without payment of just compensation. Just compensation has been held to mean the full value of the property to the

owner at the time of taking, except that there shall be excluded therefrom any element of value flowing from the taking. If there is a market for the property so taken, the market value is deemed the proper measure of compensation. If there is no market, then the value is to be determined by other considerations. But in all cases it is the value to the owner at the time of taking that is to be given.

Apparently the Comptroller General and others thought that the words of the statute, *"in no case shall the value of the property taken or used be deemed enhanced by the causes necessitating the taking and use,"* limited the amount of compensation which the War Shipping Administrator was authorized to pay under Section 902 (a).

In holding that the values were to be determined as of September 8, 1939, he disregarded the constitutional requirement that value shall be determined as of the time of taking, whatever may be the proper deductions from such value due to the taking.

On the other hand, the weight of opinion in the shipping industry, and especially among the admiralty lawyers, was that the words in question were only a restatement of the constitutional principle, as were other words used in the same section, and constituted no limitation upon the obligation of the War Shipping Administration to pay the value of the vessels taken, or their use, at the time of taking, measured, so far as possible, by market values, subject to the elimination of any values that could be said to have been created by the taking.

Although neither the Administrator nor his Counsel has ever so stated, so far as I am aware, I believe that mentally they were in agreement with the soundness of the position taken by the shipowners.

It became obvious that these differences in opinion could not be cleared up by clarifying legislative action, and for a while it seemed that the question as to what should constitute just compensation under the 1936 Act would have to be determined by the courts. This would have meant a great flood of expensive litigation.

Advisory Board

To break the impasse, the President, on October 15, 1943, appointed the Advisory Board on Just Compensation: *"to establish 'fair and equitable standards, rules and formulae of general applicability for the guidance of the War Shipping Administration in determining the just compensation to be paid for all vessels requisitioned, purchased, chartered or insured by the Administration.' The Executive Order provided further that in determining the amount of just compensation for each vessel, 'the War Shipping Administration will be guided by the general standards, rules and formulae established by the Board.'"*

Three of the most eminent judges of United States Circuit Courts of Appeals were appointed to the Board.

A public hearing was held on November 26 and 27, 1943, at which the shipping industry was represented by counsel and War Shipping Administration by its General Counsel.

The Advisory Board has now rendered its decision and laid down ten rules by which, under the Executive Order of the President, the War Shipping Administration will be guided in determining the amount of just compensation to be paid for each vessel requisitioned for title or for use. These determinations have cleared away many troublesome questions. The rules do not support the major position taken by the Comptroller General; on the other hand, the War Shipping Administration will be required to modify its approach to the problem of determining the compensation to be paid, for the Administration has overlooked values as of the time of requisition, just as did the Comptroller General.

Just Compensation

By Rule 1 the Board has ruled that: *"just compensation for vessels requisitioned for title or for use is to be determined on the basis of value as of date of taking, subject to deduction on account of enhancement, if any, as hereinafter set forth in Rule 4* [to which I shall later refer], *and with allowance for any loss on account of delay in payment from the date of taking, not exceeding the current commercial rate of interest. Value means value on the American market, not foreign markets."*

The principle thus enunciated is in accord with the constitutional principle for which the shipping industry has contended. It is a rule more favorable to the shipping industry than any principle that has been applied by the War Shipping Administration, because compensation heretofore made shipowners has not been based on value at the time of taking.

In fact, officials of the War Shipping Administration have frankly stated in testimony before Committees of Congress and elsewhere (quoting from the brief of Counsel for the Association of American shipowners to the Advisory Board), that: *"these agencies* [referring to the Maritime Commission and War Shipping Administration] *'drastically reduced steamship earnings'; rendered 'short-lived' the '1941 prosperity' of the shipping industry by slashing steamship earnings 'more than 66-2/3 per cent from the 1941 peak'; 'largely * * * destroyed' the 'wartime advantage of the steamship industry as compared with industry generally'; refused 'to pay full market value for ships' and delayed requisitioning until 'rates and values could be reduced' to prevent the owners from being in a position 'to file suit in the Court of Claims for the full market values' of the 1940-41 period."*

If tested by strict legal principles, the conclusion is easily arrived at that the methods thus confessed and exulted in by the War Shipping Administration, however high their purpose, have been of doubtful legality.

W.S.A. Responsibility

It is a justifiable conclusion that a change in attitude on the part of the War Shipping Administration is to be expected, for its first duty in arriving at the amount of just compensation to be paid in a given case, will be to determine the value of the property at the time of taking. If the rule is administered in its true spirit, as we have every belief it will be, it

should prove satisfactory to the shipping industry—for no owner asks more than that he be made good for the value of his property at the time it was taken—and it will be most salutary in its general effect.

At the same time, the ruling places upon the Administration a responsibility more definite than the brief wording of the statute. The shipping industry has thus won a great moral victory, in that shipowners are to receive compensation for their property on the same basis as other citizens are to be paid for theirs. Hereafter there is to be no discrimination against the shipping industry under the principles thus declared.

Regulations

Rule 2 provides that in the case of requisition of foreign flag vessels, just compensation is to be determined as in the case of domestic vessels.

In Rule 3 the Board advises that: "*where market value cannot be determined by sufficient sales, or hirings of vessels of like character, made at or about the time of taking, it is to be determined by the Administrator from a consideration of cost of construction, acquisition cost so far as relevant, improvements, replacement costs, depreciation, earnings, physical condition, appraisals for insurance or other purposes, and any other relevant facts upon which a reasonable judgment as to value can be based. These various matters are to be given such weight by the Administrator, as in his opinion they are justly entitled to, in determining the price that would probably result from fair negotiations between an owner willing to sell and purchaser desiring to buy.*"

This rule accords with the views of the shipping industry and the War Shipping Administration. It vests in the Administrator authority to make a determination of value which will be final and exceedingly difficult to have overruled, and certainly not without the most convincing evidence of error. Thus, it places upon the Administrator a very heavy responsibility of fair judgment.

Enhanced Values

Rule 4 deals with the question of enhancement. The Board's rule provides:

"*From the value at the time of taking, there should be deducted any enhancement due to the Government's need of vessels which has necessitated the taking, to the previous taking of vessels of similar type, or to a prospective taking, reasonably probable, whether such need, taking, or prospect, occurred before or after the declaration of the national emergency of May 27, 1941. Enhancement due to a general rise in prices or earnings, whenever occurring, should not be deducted. In the application of this rule neither the proclamation of limited emergency of September 8, 1939, nor the facts existing at that time, are in themselves of significance.*"

It may be assumed that the deduction thus directed to be made is in accordance with the constitutional principle recently elaborated upon by the Supreme Court in the case of *United States v. Miller*, 317 U.S. 369.

In so far as it may be an interpretation of the enigmatic words relating to enhancement used in the Merchant Marine Act, 1936, it would seem that a strict constitutional interpretation is inferentially placed upon those words. Thus it sustains the position which has been taken by the shipping industry.

At the same time, the fair determination of such deductions is going to be an arduous task, and being so, it imposes upon the War Shipping Administration a great responsibility, for the determinations made by the Administrator will, in my judgment, be reversed or modified only upon the clearest evidence of error. Mere differences in judgment will not suffice. In justice to the shipping industry, therefore, War Shipping Administration has thus imposed upon it by the rule definite responsibilities of a very high order.

Marine Insurance

The Advisory Board holds under Rules 5 and 6 that the enhancement clause in Section 902 (a) of the Merchant Marine Act, 1936, has no application to the valuation of chartered vessels for the purpose of insurance, or of voluntary charters, or purchases, under Public Law No. 101.

No part of the decision made by the judges is of greater importance to the shipping industry than this clear-cut ruling in respect to insurance. It should settle once and for all the question of any doubt as to the authority of War Shipping Administration to agree, as it has done in its binders of insurance, upon the values to be paid in case of a total loss of requisitioned vessels.

This is of vital importance to the shipping industry for reasons which were admirably stated by Counsel for the American Shipowners holding insurance obligations of the Government, as follows:

"*The amount of insurance that an owner carries depends on a variety of business considerations. They are entirely different considerations than those that might influence him if he were seeking to sell his vessel. The fact that the premium increases as the amount of insurance increases, keeps his insurance valuation within reasonable bounds.*

"*Unless the owner is content to carry a part of the risk himself, however, he usually insures for a sufficiently high value to protect him adequately. Insurance is customarily written for a term, usually a year in the case of hull insurance. The owner has to be protected against a rise in values during the term. Insurance written by the Administrator at the present time is often for the term of the requisition, which may extend to the end of the war and for some time beyond.*

* * *

"*Another factor of the greatest importance to an owner in insuring his vessel is the cost of replacement. Since he wishes to continue in the steamship business and is not voluntarily retiring from business, he must bear in mind the cost to which he will be put in replacing the lost vessel.*"

General Applications

Rule 7 simply provides that, "*in the event of loss due to a risk assumed by the United States in connection with the use of any vessel where no valua-*

tion or other mode of compensation has been agreed to, just compensation should be determined on the basis of value on the date of such loss." This rule is sound and in consonance with the preceding rules.

Rule 8 upholds the contention of the shipowners that Section 902 (b) has no application to vessels receiving mail pay under the 1928 Act.

Rule 9 provides that valuations agreed upon by the Administrator and owners are binding if not in excess of just compensation determined as above prescribed; and settlement should be made on the basis of such valuation, with allowance for interest for delays in payment.

Having previously held that the enhancement clause of Section 902 (a) has no application to the valuation of chartered vessels for the purposes of insurance, or to voluntary charters or purchases under Public Law 101, Rule 9 would seem to limit this authority in respect of valuation to be agreed upon. If it is only intended to apply on requisitions where no charters are subsequently signed, it is one thing; if it is a general limitation upon authority to insure, it is of serious moment.

While an owner may not expect the Government to pay as just compensation more than the fair value of his property at the time of taking, there are reasons why an owner should be able to insure his vessel so as to place himself in funds to replace a lost vessel. As one counsel in the hearing before the Advisory Committee so aptly stated, shipowners are not primarily engaged in the business of buying and selling vessels to make profits; they are selling transportation, and ships are but the tools by which transportation is provided. In face of the high cost of replacement, it would seem that owners ought to be able to insure their vessels, and pay premiums for such insurance, on a basis that will assure financial assistance in the matter of replacement.

This clause will doubtless be subject to clarification.

A Splendid Service

The Advisory Committee has done a splendid service, and the rules which it has announced justify confidence on the part of American citizens, and especially in this instance by American shipowners, that the Constitution still prevails. The rules are so clear-cut that they should be of the greatest assistance to the Administrator. While they present some knotty problems, they chart a course of future dealing between the Government and the shipping industry that is clear-cut and fair. Here and there, differences may arise in respect to values, but these can be reconciled.

Thus, both the War Shipping Administration and the shipowners, freed of controversies, can devote their time and energies to the furtherance of the great work which the shipping industry is doing as its contribution to the prosecution of the war. But settlement of the question as to what shall constitute the basis of just compensation to be paid the shipowners for their ships and their use is of greater importance than merely that justice should be done on a basis of equality to all.

American Shipbuilding

No finer accomplishment in the war effort has been made than by the shipbuilding industry. Who could have believed before this war that it would be humanly possible for American shipyards to be developed, organized and operated so that 25,284,380 tons of ships could be delivered between January 1, 1942, and a week ago last Tuesday, as announced by Rear Admiral Vickery on Saturday last? This is a tribute beyond measure to you technical men, to the organizations of your great shipyards, and above all to the splendid leadership which has been given to this work by Admiral Vickery and Admiral Land and their associates and staffs.

At the same time the shipowners and War Shipping Administration, as well as the Army and the Navy, have been doing an equally magnificent work in the operation of the country's vast fleet of merchant vessels. It has not been an easy task to build up the individual organizations necessary to handle the work, but this has been done arduously and efficiently.

This is of great significance because it means more than ever that there is developing in America a greater understanding of world shipping—that at last Americans are becoming ship-minded. America is coming out of the war, with the ships now built and planned, with the greatest merchant fleet of the finest ships ever possessed by any nation. It means that America will become a truly great maritime nation in peace time. But it cannot succeed in this unless it has trained organizations made up of men experienced in shipping who can carry on the operations. This is in the making through the allocations of the Government-owned ships to private operation.

Confidence Restored

One of the fine results which will flow from the labors of these distinguished Judges, if the work now charted by the rules is carried out in the spirit in which the rules have been laid down, as I believe will be done by Admiral Land and his associates, will be the restoration of confidence on the part of the shipping industry that it will be treated with justice, and the development of an enthusiasm and a spirit of cooperation with the Government, which is bound to spell success in the meeting of future problems. To receive truly just compensation for their ships and their use will strengthen the industry to meet the demands of the future.

America will come out of the war with splendidly developed shipping organizations, and with the means to carry on a great world transportation business. The great problem ahead for the shipping industry and the Government is to provide the ways and means of wisely bringing about a transfer of the ships needed for commercial purposes, into private ownership, on a basis that will enable their owners, with proper efficiency in operation, to meet world competition. This problem is not insurmountable; its solution only requires study, clear-headedness and courage. The President's Advisory Committee has set a good example.

Development of Steel and Iron Shipbuilding in America

Robert L. Stevens, American master shipbuilder and marine engineer.

Foreword

TODAY the United States shipbuilding industry is hectically engaged in the greatest ship production effort ever seen on the earth. Nearly every large industrial contractor has become a master shipbuilder, and millions of men and women who never before 1941 had ever seen or thought about a shipyard find themselves working in the busiest shipbuilding establishments that have ever laid a keel or launched a hull.

Under these circumstances it is well to indulge in some reflection and research to determine just how shipbuilding in iron and steel has grown up in this country, and to give credit where credit is due to the resourcefulness, energy and initiative of some of the American pioneer iron and steel shipbuilders, whose labors and struggles in no small measure have made possible the remarkable records now being made.

It is a long story—a full century of progress—and especially in its early stages must be pieced from meager records. Fortunately the historical monographs presented at the 50th (1943) meeting of the Society of Naval Architects and Marine Engineers throw some light on the subject and will enable us to visualize the formative period from 1844 to 1870 with some degree of clarity.

The fact that this year, 1944, marks the 100th anniversary of the iron hull in the American merchant marine, makes this study all the more timely.

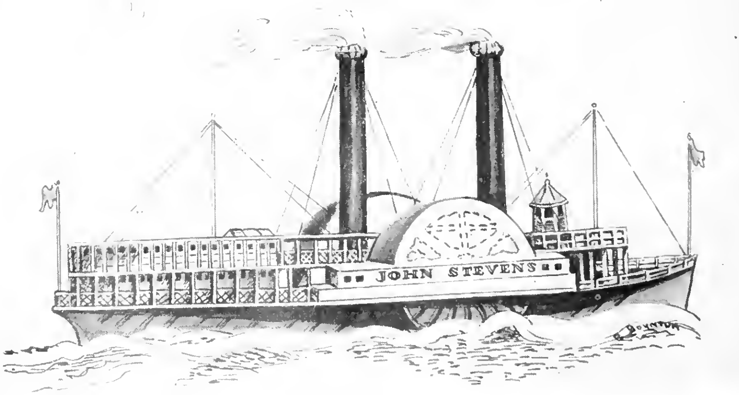
Genesis of the Iron Hull

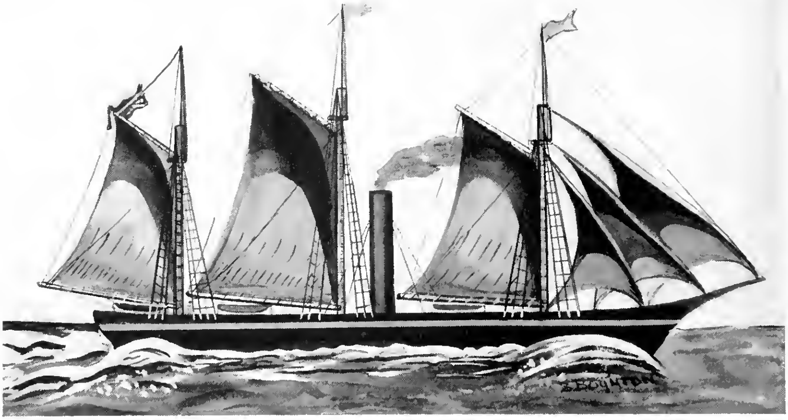
The "History of Steam Navigation," a remarkable book by George Henry Preble, Rear Admiral, U. S. Navy, published in 1895 and now out of print, is authority for the following statement: "The first steam vessel ever constructed of iron was the Aaron Manby, launched in 1820 and named for her builder. She was constructed at the Horsely Iron Works **in sections** and was sent to London and put together in dock. She ran from London to Paris via Havre. In 1843 she was in good condition, and to that time had required no repairs on her hull. She was broken up in

By

A. J. Dickie

Drawings by B. H. Boynton





S. S. Bangor, built by Harlan & Hollingsworth in 1844, the first iron twin-screw ocean-going steamer.

1855 after thirty-five years' service."

Horsely is located at practically the geographical center of Surrey, and from an examination of any good map we may deduce that these "sections" of the Aaron Manby were loaded on barges and floated down the Wey to the Thames and down the latter river to London docks, an overall distance of perhaps 45 miles. There can be no doubt that the word dock in this description indicates a graving dock basin.

Here we see that from the very beginning of the use of iron in hull construction the possibilities inherent in prefabrication and preassembly of hull sections were recognized and incorporated into shipbuilding practice. Of course at that time no other method was possible. No shipyard was then equipped for working iron, and it is was necessary to go to ironworking shops in order to get an iron hull under way. In fact, all the first iron hulls were spoken of with scorn by the established shipbuilders as being "built in a boiler shop" or "thrown together in a foundry." "What do those guys know about shipbuilding?"

The obvious advantages of stronger hulls with greater carrying capacity for equal exterior dimensions gradually overcame prejudice, and a number of "fair sized" hulls of iron were built in Great Britain before 1840. A few small lake and river boats partly iron in construction were built in America during that same period, but real shipbuilding in iron began in this country in 1844.

American Iron Hulls

One of the names most prominently connected with the development of American steamships in the pioneer days was Stevens. That family of engineers and industrialists promoted railroads and steamship lines and built locomotives and steamboats practically throughout the century. Many river boats and engines, therefore, were built at their Hoboken yards and shops.

Robert L. Stevens, son of John Stevens, a notable inventor and the founder of the Hoboken plant, was particularly devoted to the design of steamships. He is, undoubtedly, the pioneer of steam navigation on the open sea. In 1807 he built a small paddle-wheel steamer. She was christened Phoenix, and her trials were held on the Hudson just a few days after the first voyage of the Clermont. She could not be operated on the Hudson because of the monopoly held by Livingston and Fulton, so with R. L. Stevens acting as engineer she ran for a year between New York and New Brunswick. Then Stevens conceived the bold idea of taking her round to the Delaware to run out of Philadelphia to river ports. She made the sea voyage successfully and ran on the Delaware for years.

R. L. Stevens designed and built many wooden river steamboats prior to 1844. In his design work he was constantly seeking to make his hulls lighter in weight without sacrificing strength. This led to the use of iron fastenings, iron braces and iron beams. Finally, in the 1840's, he designed and built an iron hull for a large river boat which he named John Stevens after his father. This boat was completed during 1844. F. E. Dayton, in his very interesting book, "Steamboat Days," says that this vessel was: "245 feet length, 31 feet beam, 65 feet breadth over guards and 11 feet depth of hold. The engine was steeple type with vibrating cross-head having cylinder 75 inches diameter and six feet stroke." She "ran between Philadelphia and Bordentown in 1846, making better than 19 miles speed and continued in that run till 1855, when she burned." The hull was later built into a cattle transfer boat and served the Pennsylvania railroad in New York harbor for many years.

In 1843 the car-building firm, Messrs. Betts, Harlan & Hollingsworth of Wilmington, Delaware, started doing marine engine repair work. This led them into direct contact with the steamboat lines on the Delaware, and to their renting a shipbuilding berth on the banks of the Christiana River, some few miles from their Wilmington shops.

The yard thus begun became the famous Harlan & Hollingsworth shipyard. William H. Collins, general manager, Fore River Plant, Bethlehem Steel Company Shipbuilding Division, presented an interesting history of this plant before the annual meeting of the Society of Naval Architects and Marine Engineers on November 12, 1943, at New York. From this paper the following description of early activities at this plant is quoted:

"There was only one small shop on this property, and all the necessary work on the plates, bars and fastenings for their iron hulls was done at the Front and West Streets shop. The length of the ways was 200 feet, and they were capable of accommodating a vessel of only 600 tons, but this was adequate to the needs of the time.

"Hulls Nos. 1 and 2, the Ashland and Ocean, which were claimed to be the first iron steamers built in the United States, were delivered to George W. Aspenwall of Philadelphia in 1844 for trade to New York via the Delaware and Raritan Canal. At the outbreak of the Mexican War they were sold for $19,000 each to the United States Government. The Bangor, Hull No. 3, was delivered later in the same year to the Bangor Steam Navigation Company. It was claimed she was the first seagoing iron twin-screw steamer built in the United States. The Bangor was 120 feet between perpendiculars, 23 feet wide and 9 feet depth of hold. The plating was worked clinker fashion secured to flat bar frames by clamps. With a normal sheer, long raking cut-water, bowsprit and three-masted schooner rig, the Bangor had a decidedly yacht-like appearance. In 1846 she was sold to the United States Government for $28,975 and armed at an additional cost of $15,885. On October 7, 1848, the Government sold her to John F. Jeter of Lafayette, La., for $2300.

"During the 50-year period from 1836 to 1886, the company claimed many 'firsts' in the United States, including the following:

(1) To have built the first iron steamer.

(2) To have built the first twin-screw iron boat.

(3) To have built the first iron fireboat.

(4) To have set the pace for high-speed boats.

(5) To have revolutionized and established the type and fashion of high-speed side-wheel river and bay steamers.

(6) To have constructed the first tandem-compound engine.

(7) To have constructed the first steam pilot boat.

(8) To have built the first iron ferryboat.

(9) To have built the first steel steamer, exemplified by the Olympian.

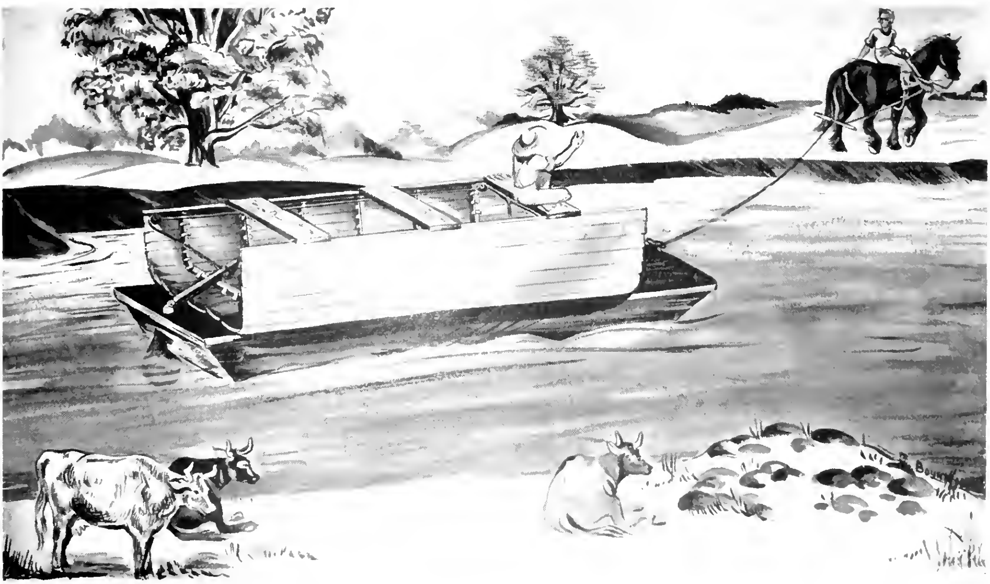
(10) To have built the first car transfer steamer, typified by the Canton, Hull No. 180. The Canton was so successful that many others followed, notably the Southern Pacific Solano, the largest carferry ever built.

"At this time (1886) the area of the land owned by the company on both sides of the River Christiana totaled 43 acres. The buildings numbered 58 and covered 6-3/100 acres. The works proper were on the north, or concave, bank of the river. The entire waterfront of 3125 feet was wharfed out for berthing vessels without interfering with navigation. The shop equipment was kept up to date and complete with tools and implements, as might be expected with 58 shops. Most of the work was done from their own design, and as they did almost everything, including castings, machinery, boilers, auxiliaries, fittings, cabinet and joiner work, upholstery, rigging, metal lifeboats and car-building, some idea of the plant's complete integration may be visualized. On the outside there were lumber yards, plate racks, building and outfitting slips, 150-ton sheer legs, gantry cranes and 4½ miles of railroad tracks."

For 83 consecutive years, 1844 to 1927, with the exception of the years 1847 and 1848, this plant made delivery of one or more ships annually.

(To be continued)

This pleasant pastoral scene shows the 1820 method of expediting pre-fab, preassembled hull sections for the S. S. Aaron Manby.



Our Shipbuilding

by Rear Admiral Howard L. Vickery, U. S. N.

IN THE SPRING of 1942, the President established as the merchant shipbuilding goal the construction of 24,000,000 tons deadweight during the years 1942 and 1943. Of this total, 8,000,000 tons were scheduled to be built during 1942 and 16,000,000 this year. As an index to the immensity of this undertaking, I'd like to point out that during the entire year 1941 there were completed in American yards only 103 merchant ships of little more than 1,100,000 tons deadweight. And even during the month preceding Pearl Harbor the total output was only nine ships of some 106,000 tons. To be sure, on December 7 many new shipbuilding facilities were in operation, or under construction, and quite a few hulls had been launched. But in the Maritime Commission, we've stopped talking about launchings; a delivered ship is the only kind that counts!

By September, 1942, shipyard output had topped a million tons a month—almost equaling the deliveries for the entire year 1941. American merchant shipyards not only met their 1942 goal, but even exceeded it. And this year they have really turned on the power. It so happens that this morning I received the final results of ship construction during the month of November, and I would like to take this occasion to announce the score.

The number of vessels delivered into service by American merchant shipyards last month was 164; their aggregate deadweight was 1,692,763 tons. Included in these totals were 16 high-speed vessels of the Commission's C-types and 19 fast tankers. Also there were completed 23 vessels of various types for military and special uses, 89 Liberty ships and 17 tankers adapted from the Liberty design. The November deliveries brought the total tonnage of ships completed during the first 11 months of 1943 to 17,194,387 tons. So with a month still to go, and 25,284,387 tons delivered so far since January 1, 1942, I am happy to be able to announce that the 24,000,000 ton goal set for last year and this already has been beaten by a substantial margin.

Five a Day

And yet even this does not tell the whole story. It became evident many months ago that the merchant shipyards had more than enough capacity, given the necessary materials, to build the tonnage called for by the Commander-in-Chief's directive. Advantage has been taken of this surplus shipyard capacity by diverting a sizable portion of the facilities to the construction of special types of ships for the armed forces, and by utilizing a number of the yards for converting merchant vessels to military types prior to delivery. Invariably these diversions have required more time, and the vessels usually have had less deadweight tonnage than those originally scheduled. Actually, therefore, the shipyards not only have completed ahead of time the job assigned to them early in 1942, but, in addition, have accomplished a decidedly more difficult assignment than that originally contemplated.

Notwithstanding even these factors, had it been possible to supply the shipyards with additional components, principally steel, they could have built substantially greater tonnage. More than five ships a day has long been routine, and if tanks, guns and warships didn't need steel too, six ships a day could have been just as commonplace months ago without the addition of any facilities.

This, of course, implies no criticism of the suppliers of materials and ship components. In fact, the very success of the merchant shipbuilding program is evidence of the splendid job they have been doing. The astonishing performance of the shipbuilders in general, and the spectacular feats of certain yards in particular, have received wide acclaim—and well they should. The breaking of records, however, does not begin on the shipways, but in the steel mills, engine factories and boiler shops, for the modern shipyard is merely a final assembly line of a nation-wide plant.

Housewives Build Ships

But the actual construction of the world's greatest merchant marine has been the handiwork of farmers, shopkeepers and housewives, workers recruited from every walk of life to learn and carry out one of the most difficult jobs in industry. The extent of their contribution towards victory may be visualized by imagining the ships they have built since December 7, 1941, steaming in a column and spaced at mile intervals. An unbroken line would be formed extending from Maine to Scotland, or, if you like, from Dutch Harbor to Tokyo.

And what of the ships themselves? The most famous type, of course, and the one which has been built in the greatest numbers, is the Liberty ship. This, as you probably know, is a standardized cargo vessel of a type which was rather common before the war in world trades where high speed was not the

and its Implications

first essential. Basically a British design, it was selected as the principal emergency type for the Commission's program and modified to meet American shipyard practices, primarily because of its reciprocating steam engine propulsion. For at the time the Liberty ship program was inaugurated, the steam turbine machinery used in the fastest and most efficient vessels could not be obtained in the necessary quantity. The choice of engine drive was a hard one to make, but it cut the Gordian knot. It made possible the vast fleet of Liberty ships that today covers the oceans of the world as they have never before been covered by a single type. To date more than 1700 of them have been placed in service, each representing 10,800 tons of carrying capacity.

10,000-Tonners

I wonder if you realize what 10,800 tons really mean? It would take four long freight trains, each of some 75 cars, to carry such a load. As another example, one Liberty ship can pick up and walk away with 2840 jeeps, or 440 light tanks. In one voyage it could supply our troops "over there" with 230,000,000 rounds of 30-caliber ammunition, or "C" rations sufficient to feed 3,440,000 men. Such are the ships that the yards have been turning out, month after month, in an average building time of little more than 40 days from keel-laying to delivery.

The importance of the part the Libertys have played in this war can hardly be overstated. These ships, which seem to be everywhere at once, now constitute approximately a quarter of all the world's tonnage, and, naturally, a much larger proportion of the shipping available to the United Nations. It needs no imagination to realize that the Allied successes during this past year would have been just plain impossible without the Liberty fleet.

Tough Ships

And don't let anyone tell you that Liberty ships aren't rugged. One of the toughest of which I have heard is the William Williams, built by the Permanente Metals Corporation, Richmond, California. Steaming through the South Pacific one afternoon, she was struck by a torpedo on the port side aft. It blasted a hole big enough to drive a truck through. Rapidly the ship settled until the stern was submerged, only the raised gun platform being above the sea. The deck was at such an angle that the entire bow and much of the forepart of the keel were completely out of water. One could row a skiff over her taffrail and beach it on the main deck. The crew took to lifeboats, standing by to await the end of the apparently doomed vessel. But she refused to sink, and after some 12 hours, a skeleton crew returned aboard to see if she could be saved. Miraculously, the propeller and shafting were not completely knocked out, so the boilers were fired and steam was raised. With engine turning over at half-speed, despite her grotesque position, the William Williams got under way. The steering gear was wrecked, and the course was maintained by an assisting naval vessel which nudged the Liberty on one side or the other, as required. For 72 hours she staggered on doggedly. Her crew, exhausted from shock and lack of sleep, brought this gallant ship safely into port, the Stars and Stripes still flying.

Of course this account illustrates far more than the toughness of a Liberty ship. The best ship can be no better than the men who sail her. I believe I would be remiss if, in passing, I did not say a few words about the role of American seamen in this war. Their deeds are not heralded like those of our soldiers, sailors and marines, but they have done their job too, and have gone about it in a quiet and determined manner. The fact that they have continued to deliver the goods, where needed, and on time, speaks for itself.

Victory Ships

Again referring to the types of ships being built, it is obvious that a fast ship is more valuable, both in wartime and for peacetime commerce, than one of medium speed. With this in mind, the Commission has expanded to the limit the facilities for the manufacture of turbine propulsion machinery, and has built as many high-speed ships as the growing capacity of these plants would permit.

Concurrently, therefore, with the emergency program, the Commission developed the Victory ship to take the place of the Liberty in shipyard schedules as additional turbines became available. The new type, although designed for ready construction in the yards now building Libertys, is very much faster, and incorporates various other features which will enhance its utility after the war. A substantial number of them will be completed next year, and it may interest you to know that the keel of the first Victory ship was laid about two weeks ago by the Oregon Shipbuilding Corporation. Oregon, by the way, is the champion of all the merchant yards, and during September established an all-time record by delivering 24 ships from its 11 ways.

C-Type Ships

The backbone of the American merchant marine of the future, however, will be the famous C-type

ships developed to fulfill the aims of the Merchant Marine Act of 1936. These splendid vessels—there are no finer ships afloat—have been built in ever-increasing numbers since the inception of the Commission's long-range building program, which was initiated in 1937. Today, of course, a great many of them are serving as military and naval auxiliaries, for which they are eminently suited. Some have been converted to aircraft carriers, others to troop transports, and still others to special purpose ships of a wide variety. All are hard at work in the most vital jobs of the war at sea. Upon the cessation of hostilities, we can count upon them to carry our flag on the sea-lanes of the world in any competition.

Perhaps Americans have felt the impact of the unavailability of tanker tonnage more than any other phase of the shipping problem, especially those who have "A" cards. Let me assure you that tankers of the latest types form an important segment of the Commission's program, and are being built at an accelerating rate. Despite the mounting tempo of the war and the insatiable thirst of our war machine, tanker production continues to keep pace with the requirements of the armed services. And when the war is over, the American tanker fleet, in its speed, modernism and efficiency, will be unsurpassed.

While I have mentioned in detail various types of ships we are building, there are others about which I shall say nothing except that we are trying not to miss any bets. Meeting both domestic and military requirements now, the composition of our post-war merchant marine will be well rounded and designed to meet any type of competition now conceivable. Who would dare say that anyone has finer railroads than we have in this country, better automobiles, or more modern air transport? The answer is obvious; in fact, we frankly admit it. Let it suffice to say that the American merchant marine, like our other forms of transportation, will be in keeping with American traditions.

U. S. Navy

I feel a proprietary pride in the glorious accomplishments of the United States Navy, and yet I know that my pride is shared with some one hundred and thirty million other Americans, each of whom knows that it is his or her Navy too. But did you ever stop to think that our Navy, which we recognize as indispensable to our national security, would be like a suit of clothes without the trousers if it did not have the merchant marine to supply its needs? Obviously, a battleship can't steam back from the Solomons when her fuel oil, ammunition or provisions run low, nor can aircraft carriers be spared for the job of ferrying planes.

Now the Navy, while a source of protection always, really comes of age only in time of war, and yet we cheerfully give it our continuous, unstinting support. Just because the merchant marine has a dual function—as a wartime auxiliary, and a commercial emissary in time of peace—should it be less deserving of our support? Our British allies have said that however important a merchant marine may be to any other nation, to Britain it is indispensable. For centuries they have depended upon a Navy, backed up by merchant ships, for their security, and certainly they should know whereof they speak. I, too, should like to go on record, here and now, by saying that as long as the Stars and Stripes fly over an American Navy, a strong American merchant marine will continue to be indispensable to the defense of our own United States.

Subsidies

No one complains, or should complain, that the Army and the Navy are not self-supporting. The merchant marine, on the contrary, can pay its own way to a large extent. All of us are proud of our American way of life; our standard of living is the envy of the world. But that means higher wages, and accordingly ships that cost more to build and crews that cost more to employ. Who would want our shipbuilders or our merchant sailors to receive wages that are not commensurate with those paid by other industries? In order to keep our ships at sea, therefore, the Congress has seen fit to establish subsidies for both shipbuilding and ship operation.

As applied to shipbuilding, this means only that a ship built in an American shipyard by the Government is sold to the operator at a price comparable to that which the foreign competitor pays for this ship built at home. In ship operation, the subsidy paid, in general, is the difference between what the foreign competitor pays those who man his ships and the wages paid our own seamen. The word subsidy, however, has come to be looked upon as an odious one. To strip it of all its mysteriousness, in so far as the merchant marine is concerned, it can best be expressed as the payment of an "equality" wage.

It should be remembered in this connection that a subsidy is paid a ship operator only when he can prove that he is unable to compete without it. Now it costs almost as much to operate a ship with her holds half filled with cargo as one fully laden. Accordingly, the more cargo the greater the revenue, and the less the need for a subsidy. Since the American people, as taxpayers, are the ones called upon to defray subsidies, it is to their own very real advantage to take the trouble to give greater support to their merchant marine through increased patronage. To back the American merchant marine is good business, any way you look at it.

Ship American

A prime factor in the success of American enterprise has been service. But it must be more fully exploited in order to encourage the patronage of American ships. For example, in this war much effort has been spent on coordinating transportation from factory to battlefield, and from farm to foreign shore. Why can't the same idea of an integrated chain of transportation be profitably employed afterwards? I should like to see shipments booked from Minneapolis to Melbourne, for example, in a single transaction. Perhaps there could be developed something like a single bill of lading covering truck, rail and ship transportation. Voluntary cooperation between carriers could eliminate yards of red tape,

obviate pyramided overhead expense, and result in greater benefits for all concerned.

And while on the subject of "service," I want to take this opportunity to say that, in my opinion, one of the bang-up jobs of this war has been done by the railroads. In 1918, sidings were filled with freight cars all the way from here to Buffalo, and our warehouses and piers were glutted with cargo. This time, under a much greater strain, the railroads have functioned as a single well-oiled machine and have kept the flow of traffic from bogging down. I believe in addition, however, that one of the factors which has helped to make this possible is that as fast as the railroads have been able to move cargo to the seaboard, ships have been there to pick it up and take it away.

But notwithstanding the job that is being done and the proved necessity of maintaining an adequate merchant marine at all times, there still remains the problem of determining the actual disposition of the vast fleet this country will possess at the end of the war. In overall size, it will exceed the requirements of the trade routes formerly served by United States flag vessels. Yet there should be a way in which the ships which have done so much toward winning the war may be utilized in the job of making victory permanent.

Conversion to Commerce

Just as a thought in this regard, I would like to bring up the matter of the trade routes formerly maintained by Germany and Japan. It is hardly conceivable, in my opinion, that these nations could again be allowed to become naval powers. When you consider the treacherous use they have made of merchant shipping, in both a commercial and military sense, it seems equally inconceivable that they could be trusted to resume their former places in the maritime world. Hence we and our allies might well help in serving some of the routes they formerly dominated.

Perhaps the knottiest problem in the conversion of the merchant marine to a peacetime basis will be the Liberty ships. Built for the purpose of helping to win the war, they are fulfilling their mission with unqualified success. The ships themselves, however, will not cease to exist when the war is over, and undoubtedly the United States will have on its hands a fleet of emergency type vessels alone comprising more tonnage than the largest merchant marine any nation ever possessed prior to the present war. Libertys are altogether outclassed on routes where high speed is a major factor. Naturally, both the Government and industry are giving much serious thought to their peacetime disposition, and various plans are being studied. But it must be recognized that the successful solution to the problem requires widespread public appreciation of the basic factors involved.

Even the disposition of the Victory ships, C-types and tankers will not be without its difficulties. The Maritime Commission, under the policies enunciated in the Merchant Marine Act of 1936, is committed—yes, dedicated—to an American merchant marine, privately owned and privately operated. The sale of ships presently owned by the Government *must* be made on a basis that will enable private enterprise to succeed. The basis must be geared to the long-range view, and a flurry of temporary prosperity among fly-by-night operators does not fit into the picture. The sale of tonnage at bargain-basement prices could only weaken the merchant marine in the long run, and would ruin investors who have had faith in America as a maritime nation. At the same time, it must be borne in mind that ships built during the war are substantially more expensive than if constructed a few years ago, or in the post-war era. Shipyards are operating on an extended work week, are paying shift premiums, and are employing an overwhelming preponderance of newly trained workers. These extra costs, in my opinion, are part of the expense of fighting the war, and I think when victory comes Congress can well afford to write them off.

Commerce and Trade

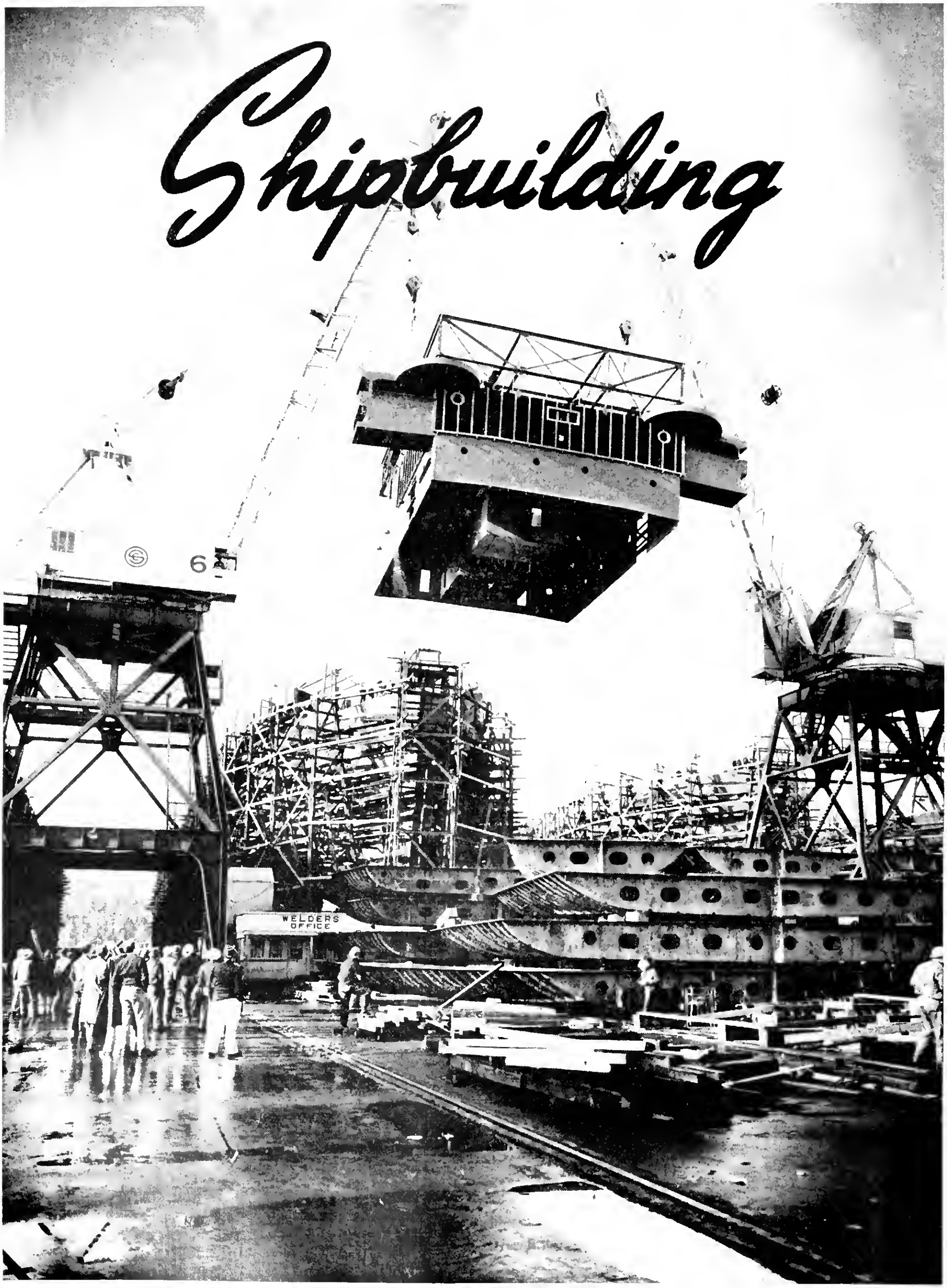
But commercially, ships in and of themselves mean little. It is the manufacturing, the trade, and the commerce behind those ships that count, for the merchant marine is but the tool of foreign trade. A more active exchange of goods and commodities, in my opinion, will mean greater prosperity, not only for America, but for all those with whom such intercourse is carried on. I like to think that a world where all are better acquainted, and everyone is busily engaged in producing and exchanging goods, will be a happier world, in which all people may expect more security and a more peaceful way of life. America has unequaled potentialities for contributing to such a world. But past experience has shown that we can have but limited control over our participation in foreign commerce unless we carry in our own ships a proper share of our imported and exported goods.

I am glad that there seems to be a wider realization now than ever before that America cannot go her own way independent of the rest of the world. What may not be so well understood, however, is that our merchant marine—ships that spend most of their days beyond the horizon—is the principal medium through which our actual, rather than theoretical, foreign relations will be established. If our aims for the future are to be realized, if the promises we have given the rest of the world's free peoples are to be carried out, Americans will have to stand squarely behind the ships that go forth carrying the Stars and Stripes to other lands.

And so, in closing, remember that we have the ships, the men to sail them, and we have great industries eager to do business. *For defense, for prosperity, and for a lasting peace, I say, let us have an adequate American merchant marine.*

The author is Vice Chairman, United States Martime Commission, and Deputy Administrator, War Shipping Administration. Text is from an address before the University Club, New York City, on December 4, 1943.

Shipbuilding



on the Pacific Coast

This necessarily very brief survey of Pacific Coast shipbuilding in 1943 includes only the program of construction in yards working for the U. S. Maritime Commission. Paralleling this program, and in a few cases partly occupying the same yards, there are large construction commitments from the U. S. Navy and the U. S. Army, including combatant and auxiliary units of all types from floating drydocks to battle cruisers. This naval and army building does not loom up with the merchant vessel construction in tonnage figures, but in numbers of units far surpasses the latter, and provides a tremendous backlog of machinery and equipment orders for marine manufacturers. We hope in a later issue to cover completely this military phase of West Coast shipbuilding.

During the last few months of 1942 the new "Liberty" shipyards of the Pacific Coast were making very spectacular construction records on single ships. In October of that year, Oregonship delivered one in 14 days from keel-laying, and received the plaudits of the world. Here was a world's record, so much better than any preceding it that it would probably last for many years. However, Richmond Yard No. 2 decided to have a try, and six weeks after the Oregon record had been written into history, the Richmond yard finished a Liberty in seven days, 14 hours and 29 minutes.

All through 1942 the Pacific Coast shipyards had been feverishly building up plants, procuring machinery and training employees. The impact of a great mass of untrained intelligence on the shipbuilding industry naturally led to many suggestions for time-saving methods, tools and equipment. Many of these proved to be very valuable, and were adopted as standard practice in the yards.

Record for 1943

After the two record-breaking performances listed above, the large steel shipyards settled down to a steady output of tonnage that put the ships overboard with regular clocklike precision. Note the figures in the table herewith, and remember that Calship, the first on the list, has had to change a number of these delivered EC-2 type (Liberty) to tankers, as well as getting part of the yard ready for changeover to Victory type, and that both Oregon and Per-Two have also been somewhat slowed down by preparation for changeover to Victory ships.

Possibly the most remarkable progress shown in this table is that indi-

cated by the comparative 1942 and 1943 scores of the Kaiser Swan Island and the Consolidated Steel yards. The Swan Island plant, building large tankers, delivered one ship in 1942, 43 ships in 1943. Consolidated Steel delivered one ship in 1942 and 57 ships in 1943.

The first four yards on this list have specialized on the Liberty type cargo steamer. During the 365 days of 1943, the two combined Permanente Metals Corporation yards at Richmond, California, have averaged a delivery of one ship every 31.4 hours, night and day. On the same basis, Oregonship has delivered a ship every 42.5 hours and Calship has delivered a ship every 44.4 hours.

The combined production of these three yards for 1943 was 680 EC-2 cargo steamers of 10,500 tons total deadweight each, or a total tonnage of 7,140,000 deadweight tons. This is more than seven times the total merchant tonnage delivered by American shipyards in 1941, and almost 38 per cent of the total merchant tonnage delivered by American shipyards in 1943. These three Liberty yards combined delivered a Liberty cargo vessel ready to go to sea every 12.5 hours night and day throughout the year.

The detailed statistics of such shipbuilding provide amazing figures of certain outfitting equipment and material. Two million tons of ship steel was fabricated and erected into these 1943 ships. Some 35,000 miles of seam were welded in the operations. The piping installed would make a pipe line 4500 miles long. Over 2200 miles of manila and 1500 miles of wire rope were reeved through the cargo blocks and installed as rigging. Six hundred and eighty Pacific-Coast-built 2500-hp triple-expansion engines were installed. 1360 water tube boilers, 6800 cargo winches, 1680 steering engines, 1360 generating sets, form a few of the major items, all of which had to be contracted for, expedited, warehoused, and in numerous instances conditioned for operation before installation.

Taking the totals for the Pacific Coast and comparing them with the totals for the United States, we figure that in the year 1943 the West Coast yards produced slightly over 50 per cent of the total U. S. Maritime Commission tonnage produced in the United States.

It will be noted that this list of shipyards working for the U. S. Maritime Commission on the Pacific Coast contains only one old-established steel shipbuilder — the Moore Dry Dock Company of Oakland, California. The record shown for this yard does not include all its activities. In addition to the C-2 vessels built for the Commission, this yard is building for the U. S. Navy, and is doing a tremendous job in ship repair work. Since January 1, 1942, Moore's has repaired, reconditioned, repainted or rebuilt a ship every 18 hours, and in the very vital matter of keeping the wartime merchant fleet in operation, is the most useful shipbuilding establishment on the Pacific Coast.

1944

Entering 1944, Pacific Coast steel shipyards working for U. S. Maritime Commission all have a backlog of orders that will keep them busy throughout the year. The type of ship to be built in most of the yards is changed. New Victory type vessels and tankers are largely replacing the Liberty type. The standard C-1, C-2 and C-3 types will still be turned out by the yards specializing on those fast cargo carriers. The larger C-4's and P-4's will be more in evidence in the deliveries. Both the Maritime Commission and the builders are basing their present plans on uninterrupted shipyard activity in 1944.

U. S. Maritime Commission — Pacific Coast

CONSTRUCTION SUMMARY - 1942 and 1943

Shipyard	Type	Deliveries Year 1943	Tonnage Year 1943	Deliveries Year 1942	Tonnage Year 1942
Calship	EC2	196	2,116,800	109	1,177,200
Oregon	EC2	205	2,214,000	113	1,220,400
Per-One	EC2	92	993,600	55	594,000
Per-Two	EC2	187	2,019,600	63	680,400
Marinship	EC2	10	108,000	5	54,000
Marinship	T2-A2	5	82,915		
Consolidated	C1B	48	436,992	1	9,104
Consolidated	S2-AQ1	9	9,000		
Moore's	C2	28	259,000	3	27,750
Western	C3	18	222,174	4	49,372
Kaiser-Three	C4	4	24,376		
Kaiser-Vancouver	LST	26	57,200	4	8,800
Kaiser-Vancouver	BB3	19	55,043	2 -EC2	21,600
Kaiser-Swan	T2-A1	43	720,895	1	16,765
Kaiser-Four	LST	15	33,000		
Kaiser-Four	S2-AQ1	2	2,000		
Concrete Const.	B7	16	102,752		
Barrett & Hilp	B7	7	39,809		
Pacific Bridge	N3	8	23,232	1	2,909
Year's Total		938	9,520,388	361	3,862,300
					+ 56,044*
					3,918,344

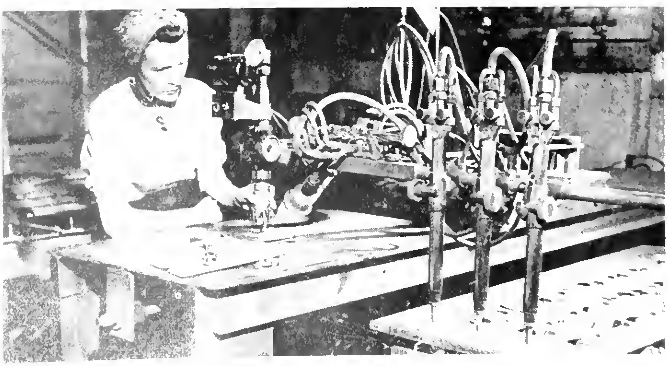
*Allowed by Vickery at Seattle-Tacoma

WOODEN VESSELS

Anacortes	B5-G1	2	7,824		
Olympic Shipbldrs.	B5-G1	5	19,560		
Hodgson-G-Haldeman	B3-F1	5	7,465		
Seabell	B3-F1	3	4,479		
Birchfield	V2 Steel	3	300	3	300
Year's Total		18	39,628	3	300
Grand Total		956	9,560,016	364	3,918,644

Total Ships - 1942	367	Tonnage	3,918,644
Total Ships - 1943	956	Tonnage	9,560,016
Grand Total-Two Years	1320		13,478,660

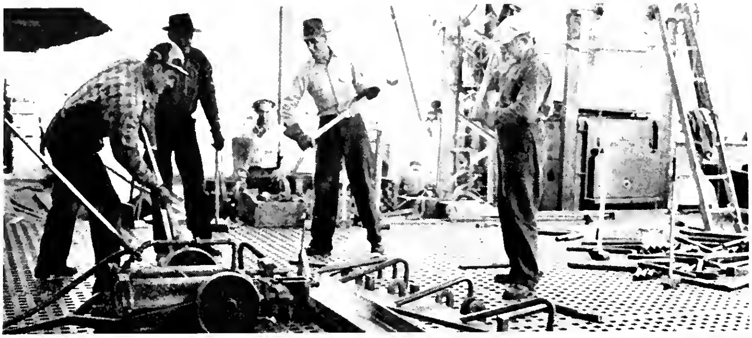
TRAINING FOR THE WORK AHEAD



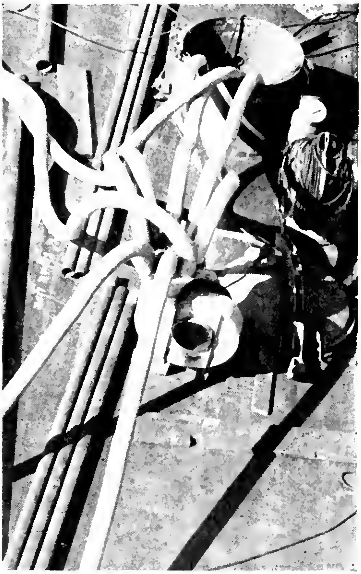
Training—a major problem in Pacific Coast shipyards—is handled largely by the yards in combination with the public school systems and the universities. Here we see four examples of in-yard training of employees in burning, welding, general ship construction and blueprint reading, and multiple flame-cutting machine.

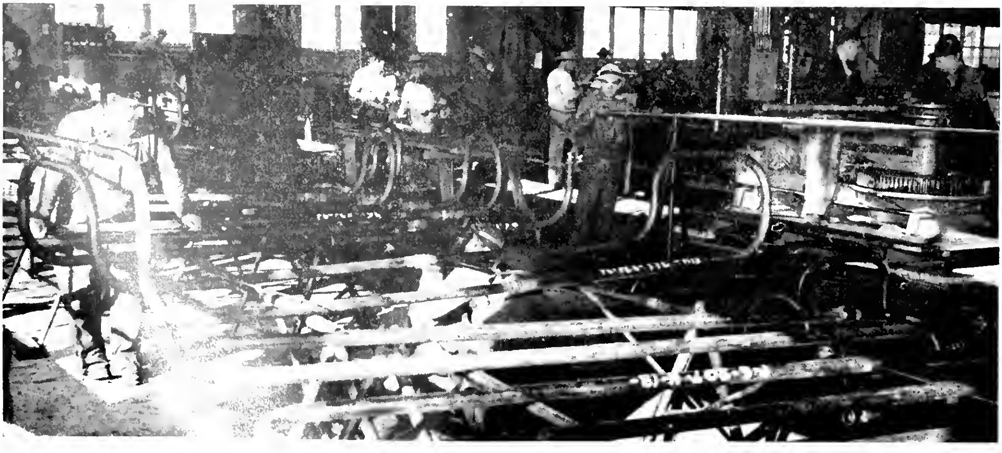
(Continued on next page)

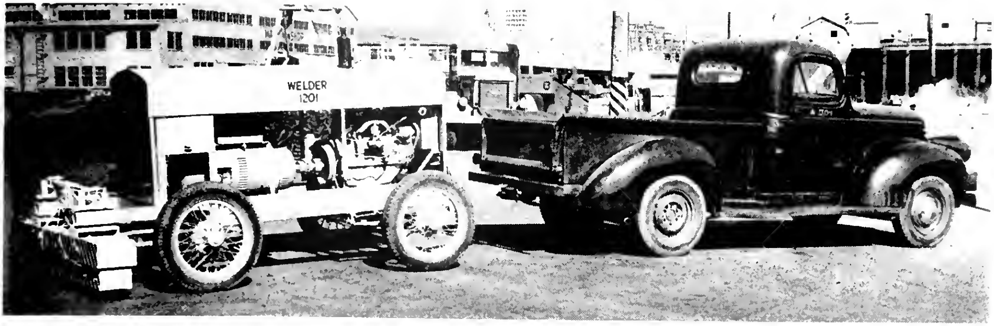
AT WORK IN THE YARD

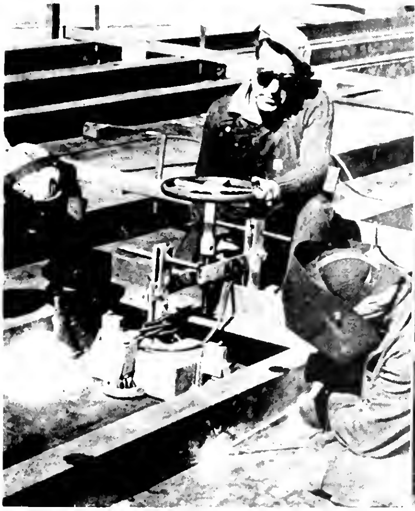


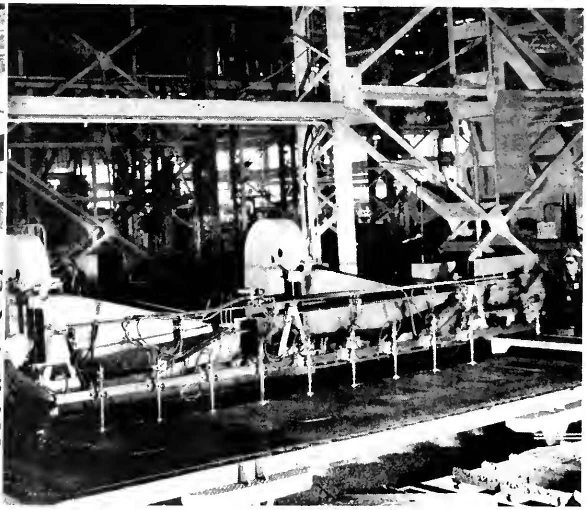
Four types of shipyard work are shown here. Above, the men with the sledges are hat-shaping frames on the bending slab; at left, two welders are busy on a bracket plate; at right, an electric blower provides fresh air for eight underdeck spaces; and below, pipefitters are prefabricating pipe for various pipe systems.











Millions of man-hours have been saved by ideas proposed by workers to whom shipbuilding was a new experience. Top view shows a magnetic sweeper for picking up nails; center left shows a magnetic clamp; center right shows a multiple flame-cutting machine; and the bottom photo shows a gadget for boring flange bolt holes on a shaft.

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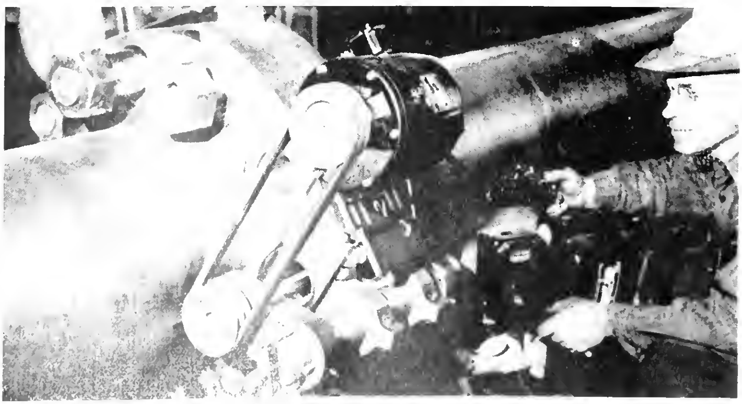
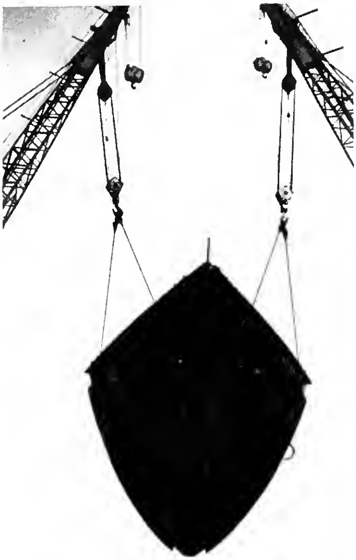
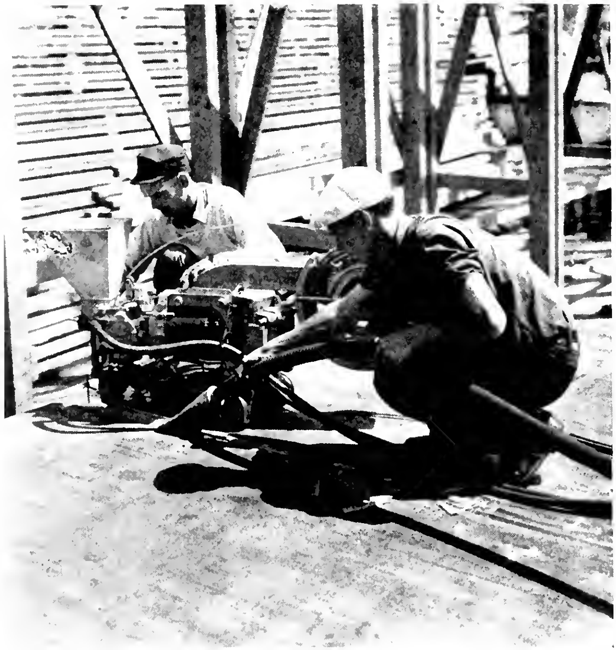
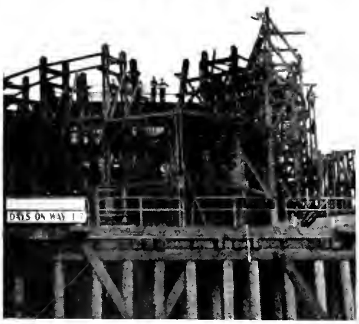
NEW IDEAS SPEED OUTPUT



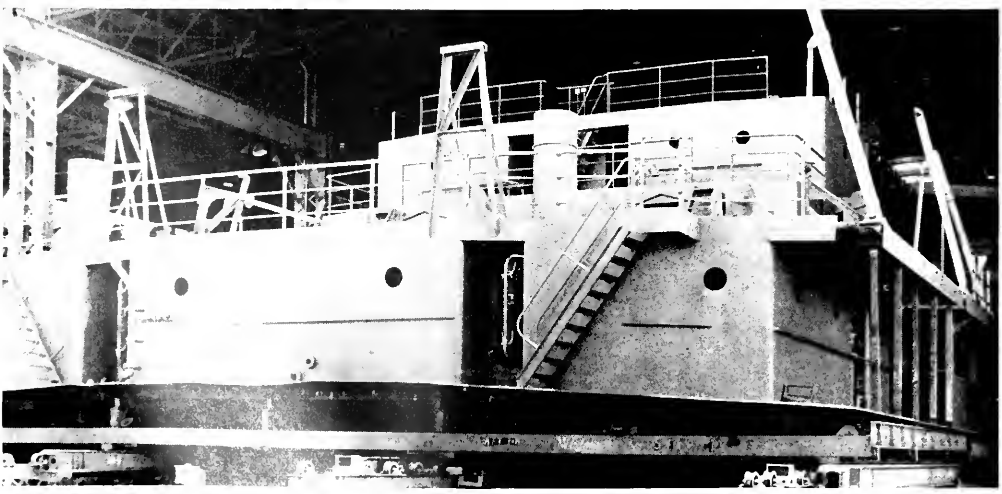


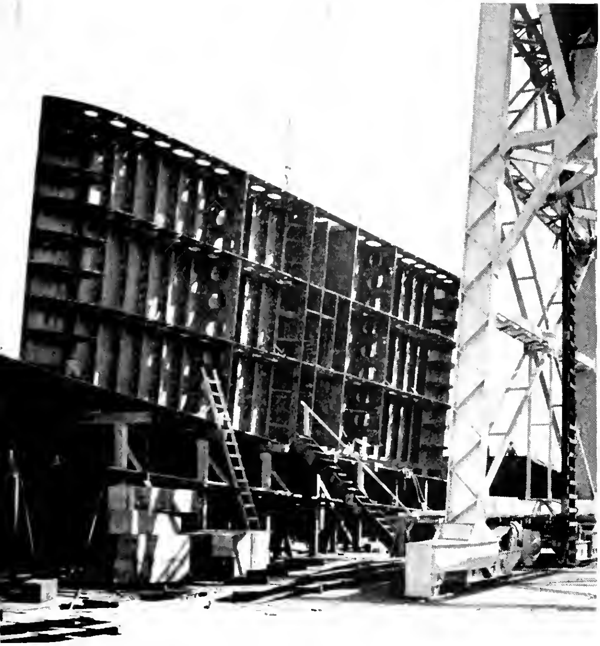




YARDS ARE GOING

The six pictures on these two facing pages give some small idea of routine activities in Pacific Coast shipyards—prefabrication and assembly of large sections of the steel hulls, Unionmelt welding of decks and bottoms, and rapid erection of wooden hulls. The two inner pictures at the top are of the year 1939. They were taken at the yard of Moore Dry Dock Company, and show the first Pacific Coast application of the modern welded pre-assembled section method.





ALL-OUT FOR VICTORY

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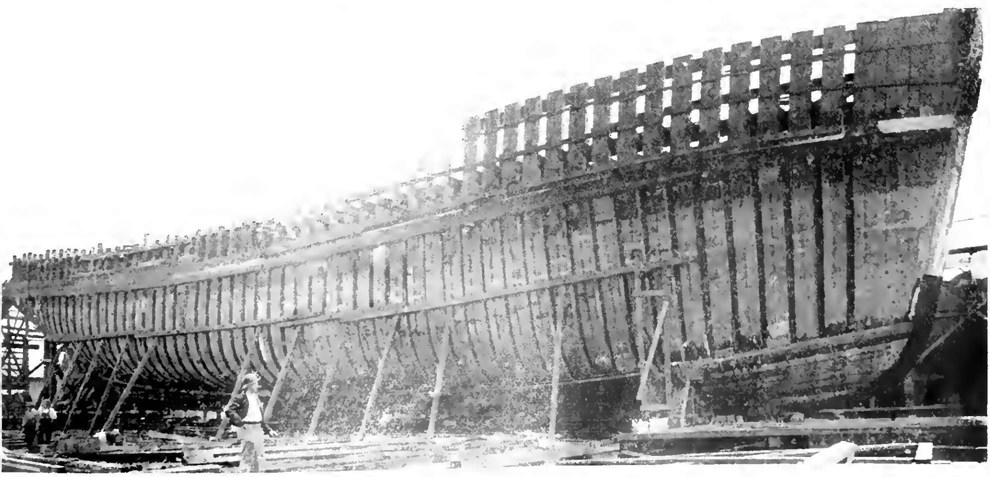
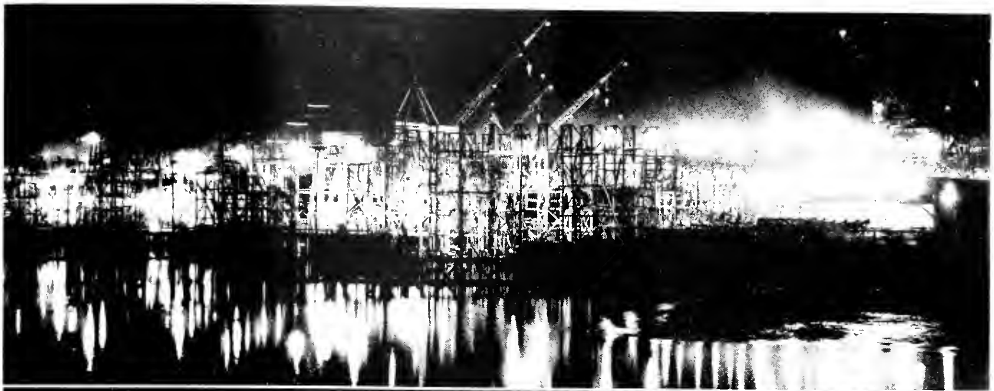
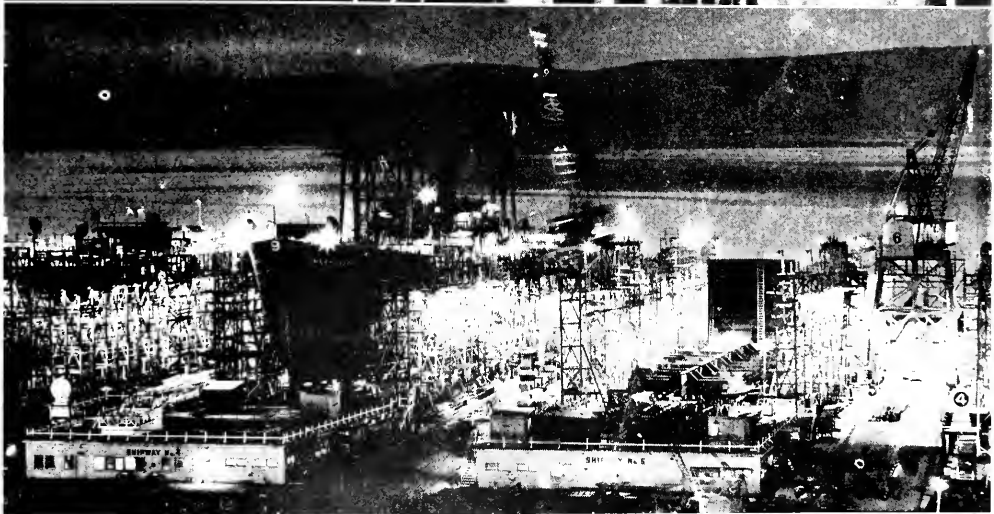


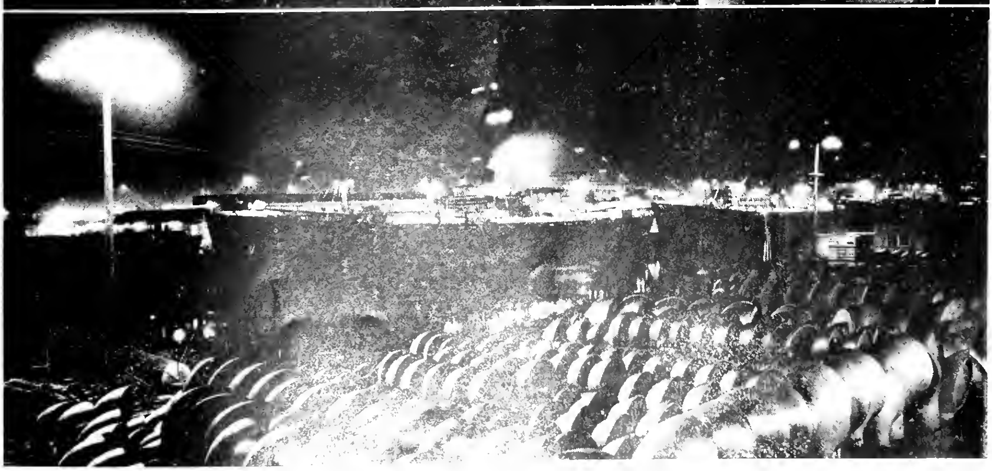
PRODUCTION CONTINUES ALL THROUGH THE NIGHT

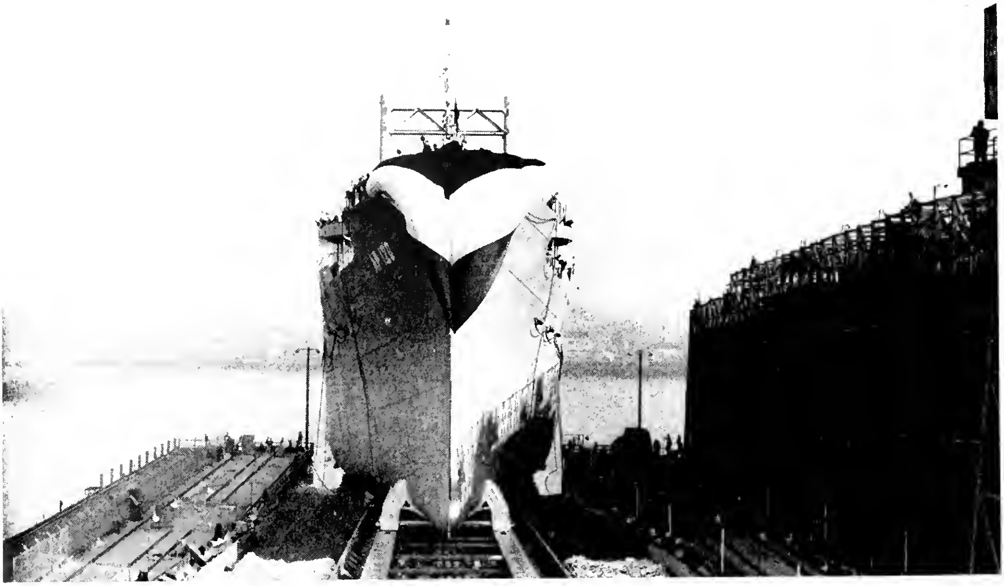
During 1943 shipyards on the Pacific Coast worked round the clock 365 days.

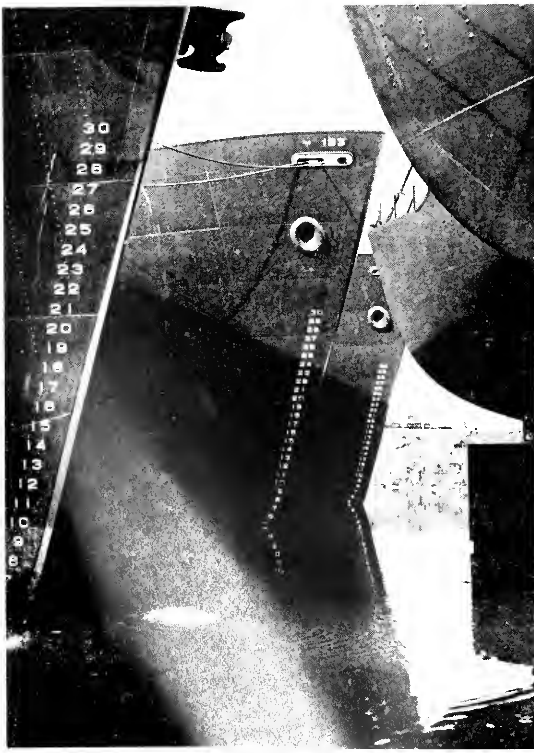
(Continued on page 94)

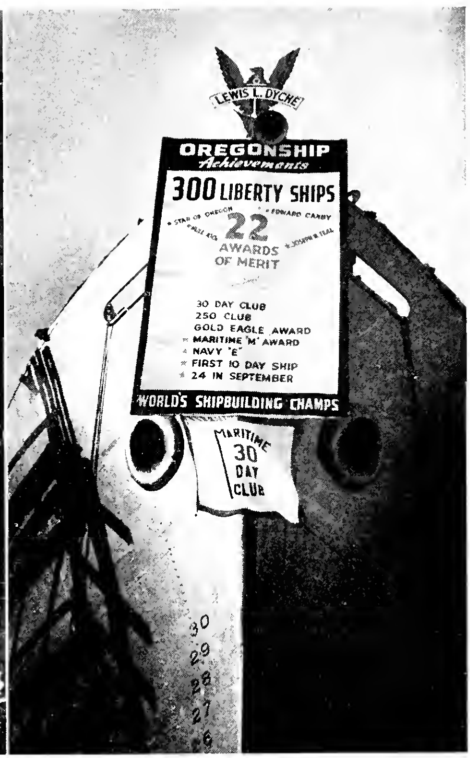




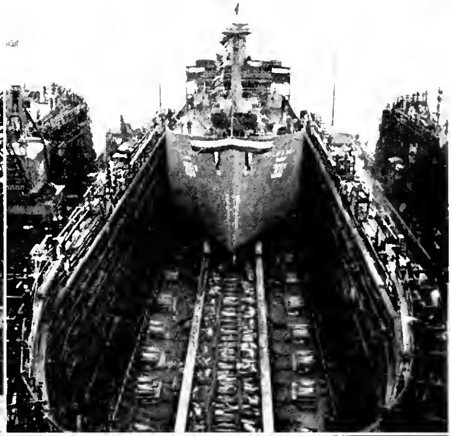


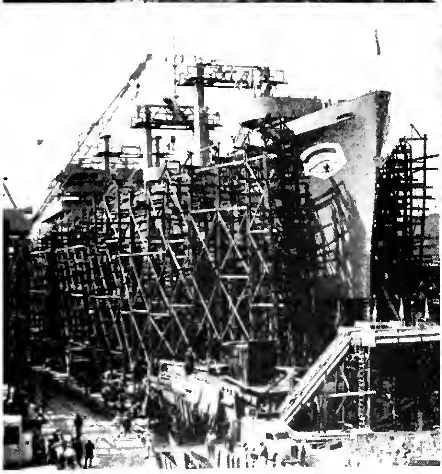


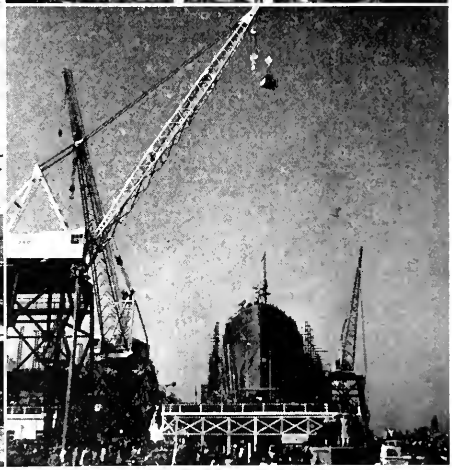



LEWIS L. DYCHE
OREGONSHIP
Achievements
300 LIBERTY SHIPS
22
AWARDS
OF MERIT
30 DAY CLUB
250 CLUB
GOLD EAGLE AWARD
MARITIME 'M' AWARD
NAVY 'E'
FIRST 10 DAY SHIP
24 IN SEPTEMBER
WORLD'S SHIPBUILDING CHAMPS
MARITIME
30
DAY
CLUB

OFF THE WAYS







At the top of the facing page is shown an unusual launching—S. S. Admiral Benson from the Alameda yard of Bethlehem—the largest merchant ship to be launched on the Pacific Coast. The picture below and to the left of the Admiral Benson shows bows and sterns of Liberty ships at outfitting dock. On this page are shown, above, Oregonship laying first Victory keel, Calship launching 300th Liberty, Moore laaunching the C-2 Golden Gate, and Kaiser launching a tanker at Swan Island. Below: Kaiser launches a flat top at Vancouver.

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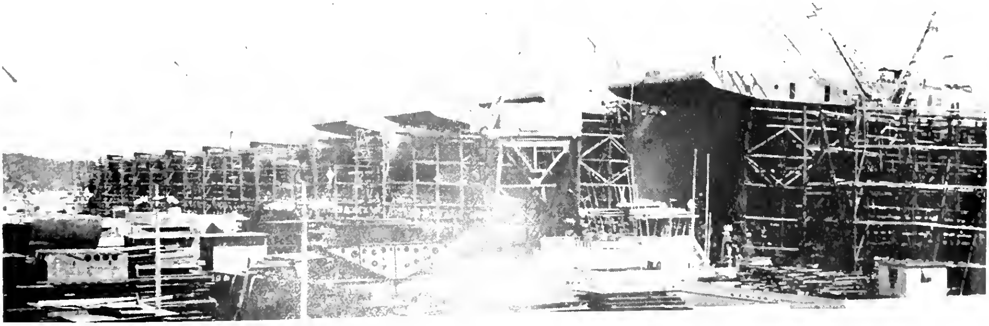
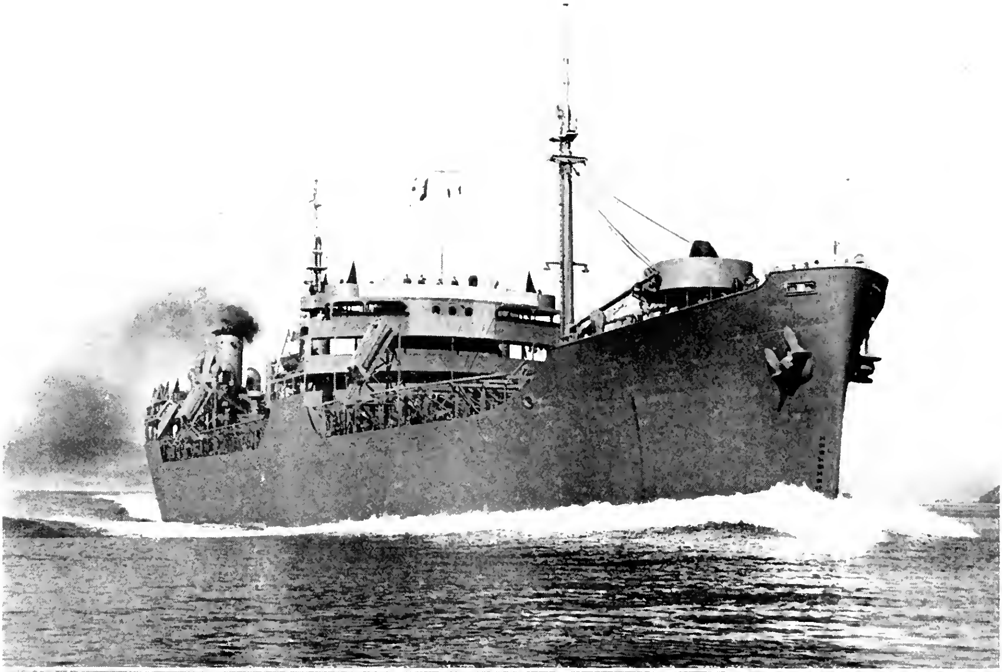
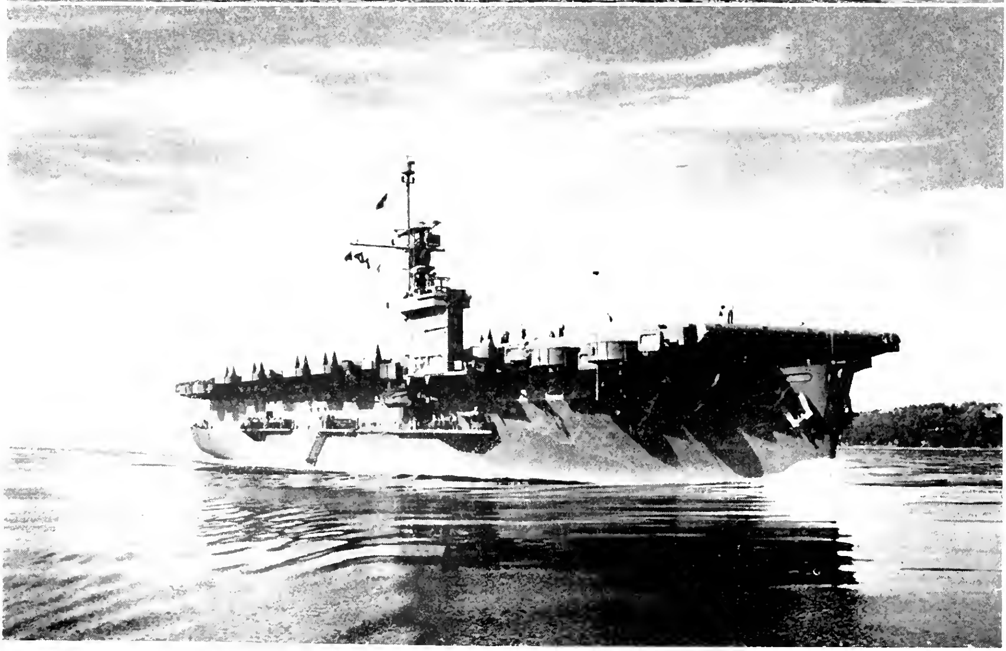
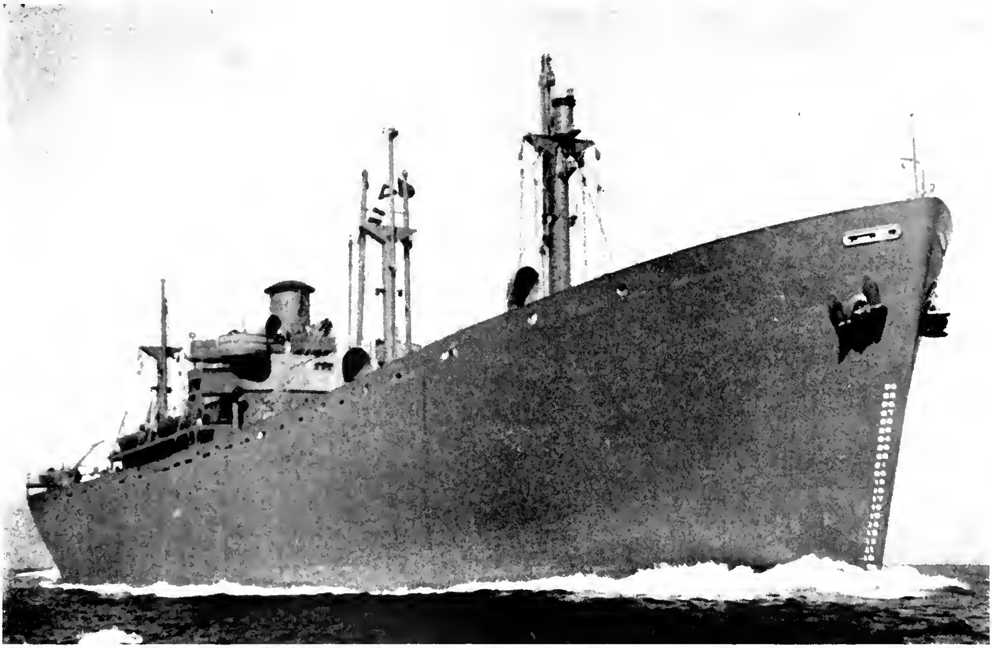


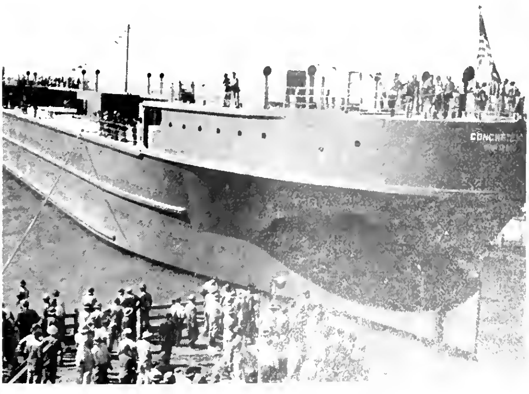


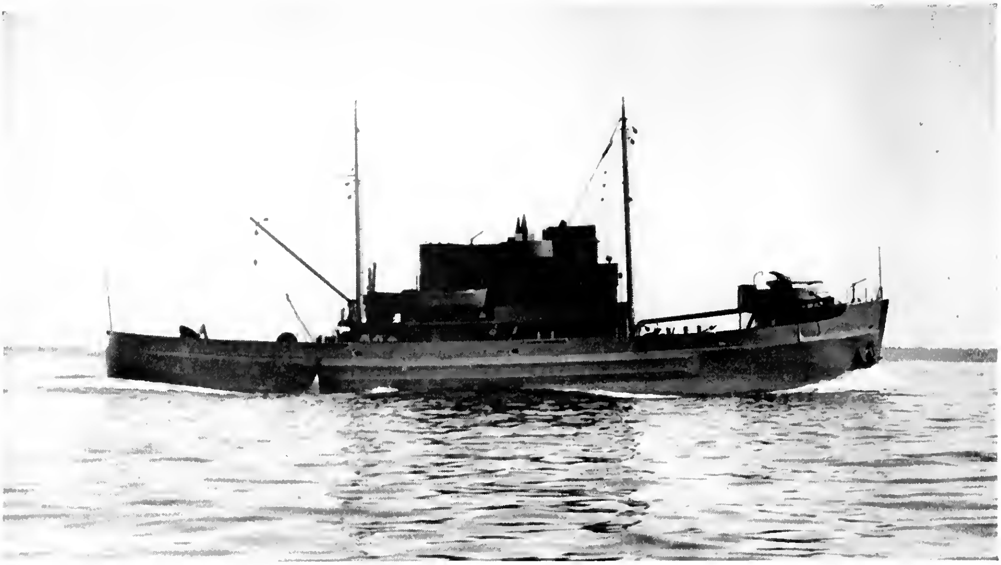




THE SHIPS THAT BRING VICTORY CLOSER

A tanker, a flat top, two Libertys and a concrete barge.





One of the first wooden-hull salvage ships to be completed on the Coast for the Navy. It was constructed by the Bellingham Marine Railway & Boatbuilding Company.

SALVAGE TUGS for the NAVY

SEVERAL large wood and steel hull salvage vessels have been built by the Bellingham Marine Railway and Boat Building Company of Bellingham, Washington, and a few of these are now ready for service. There is a tremendous mass of marine salvage operation now needed, and it is estimated that most of the salvage vessels recently built will be worn out long before the work already waiting for them is completed.

The vessels building at Bellingham are for the U. S. Navy. They have a utility type, very heavy construction wooden hull fitted with steel bulkheads, steel sheer strake bulwarks and steel superstructure. They are equipped with four Cooper-Bessemer-General Electric diesel-electric generating sets that furnish power for twin-screw General Electric propulsion motors and for the fire and salvage pumps and other auxiliaries. Three auxiliary diesel-electric generators are furnished for lighting and for small auxiliary power.

The overall length is 187 feet and the keel 170 feet. Carefully selected Douglas fir is used for the keel, which is made in several pieces joined by carefully fitted through bolted long scarfs. The stem is of oak, and a four-inch oak shoe extends the length of the keel. The frames are of oak with double planking, both layers running fore and aft and with heavy inner ceiling. Layer of planking is 2 inches thick fastened throughout with galvanized nails, and out layer is 3 to 5

View of twin-screw stern of salvage vessel sliding down ways at Bellingham. Note that she is being launched bow first.

inches thick through bolted. The inner ceiling is 5 to 8 inches in thickness. Deck beams are provided at every frame through bolted to frames and the fir deck of stringers, shelves and clamps. Heavy oak floors at every frame are bolted to the keel. Altogether this composite hull is a very strong, sturdy piece of ship construction, and should have long life, even in the heavy service demanded of salvage craft. Each hull contains approximately 300,000 feet of fir, 15,000 sq. ft. of waterproof plywood and 192,000 feet of oak.

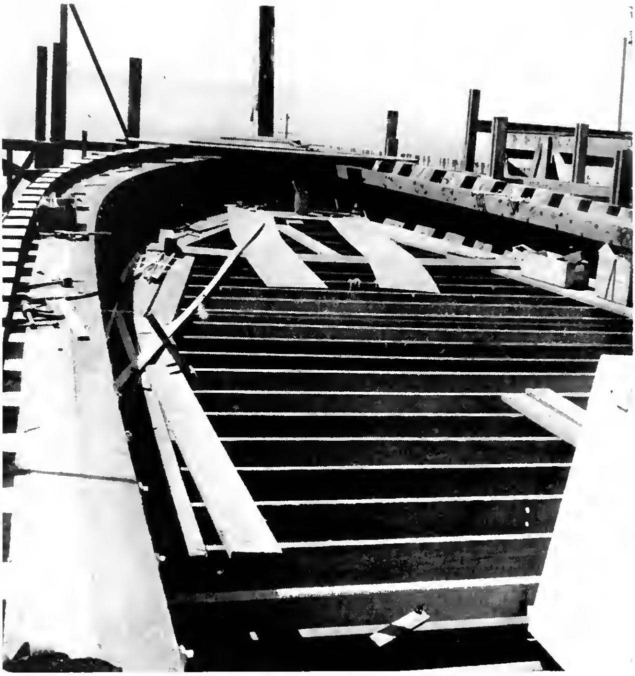
The upper strake of the ceiling is steel, and in combination with the steel bulwarks continuous for the entire length of the vessel, forms a strong steel sheer strake for the hull. The deck house erection is all of steel.

Very elaborate machinery and equipment for salvage work is fitted on these vessels. This includes: a portable donkey boiler; various capacities in portable pumps; portable electric generating sets; portable air compressors; portable welding machines; underwater cutting and welding equipment; diving equipment; four 8000-lb. salvage anchors; and two 6000-lb. ship anchors. A roomy machine shop with the most modern machine tools for salvage and repair work is fitted aft. Deck gear includes two 10-ton salvage capstans and two 10-ton cargo winches.

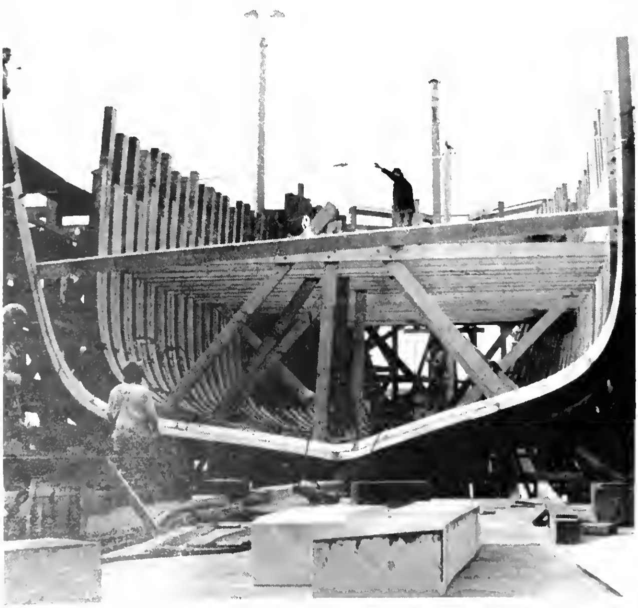
The spectacle frames, shaft bushings, rudder stock and rudder quadrant are all of fabricated steel. An electro-hydraulic steering gear is fitted with control in the wheelhouse.

Electrically-driven fire pumps with 1500-gpm capacity are connected to hose manifolds at each side of the deck house and to monitor nozzles forward and on top of the deck house.

Quarters for officers and crew are arranged in the deck house and below the main deck amidships. Ample refrigeration capacity, a complete modern ship's galley, well ventilated and heated quarters and a stury seaworthy hull combine to insure crew satisfaction on long salvage trips.

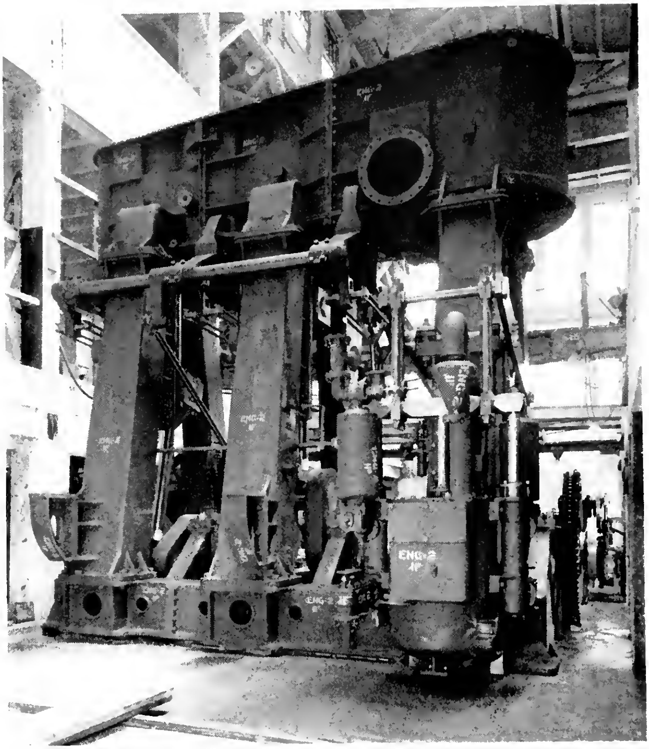


This photo, taken during construction of BARS 9 (Lincoln Salvor), shows the topside of the hull. Size of timbers gives an idea of the heavy construction that goes into this type of vessel.



Heavy oak ribs are used in the construction of these salvage vessels.

Coal To



The Liberty triple-expansion engine that Iron Fireman Industrial Division is producing, as shown above, is 23 feet high, 22 feet long, 16 feet 8 inches wide, weighs 270,000 lbs. and develops 2500 hp.

The Iron Fireman Manufacturing Company, which for 20 years has been recognized as the world's leader in the production of domestic coal stokers, is now gaining wide reputation as a builder of triple-expansion marine engines for Liberty ships.

In recognition of the company's building record of marine engines, the U. S. Maritime Commission has presented them with the "M" pennant for outstanding production achievement, and awarded the Victory Fleet flag in March, 1943. Six months later the first gold star was put on the "M" pennant.

The initial contract, calling for the manufacture of 45 engines, was awarded in February, 1942. Six days later the firm leased the vacant building of a former iron and steel works, then equipped the plant, made patterns and arranged for subcontracting.

At the time the first contract was awarded, Portland's labor supply had already been virtually drained by the heavy demands of shipbuilding plants. However, President T. H. Banfield gathered a nucleus of top-notch machinists and production specialists, and arranged a complete system of shop training. Through this they were able to mold a crew of inexperienced men into an organization of mechanics of unusual ability.

Under the leadership of Jack L. Jennings, general manager, they began machining, fabricating and erecting these engines—23 feet high, 22 feet long, 16 feet eight inches wide, weighing 270,000 pounds. The engines have: cylinder bores of 24½", 37" and 70"; a stroke of 48"; and a capacity to develop 2500 horse power under normal operating conditions.

New machinery for much of the work connected with the manufacture of these engines was not available. Consequently used machinery was gathered from all over the nation. On March 15, 1942, the first machine tools were delivered to the shop, and ten days later it was in operation. Each machine acquired had to be rebuilt to meet the requirements of the job, and the entire shop had to be assembled and equipped while actually engaged in the production of engines.

When Rear Admiral Howard L. Vickery of the U. S. Maritime Commission visited the plant in July, 1942, he was so impressed that he requested the company to expand to increase its production facilities. To make this possible, the Maritime Commission, through the Defense Plant Corporation, supplied an additional $425,000 to build a new wing, which was completed in the winter of 1942.

At a special ceremony on April 12, 1943, approximately 10 months after the first engine was completed, the delivery of the plant's 100th engine was celebrated.

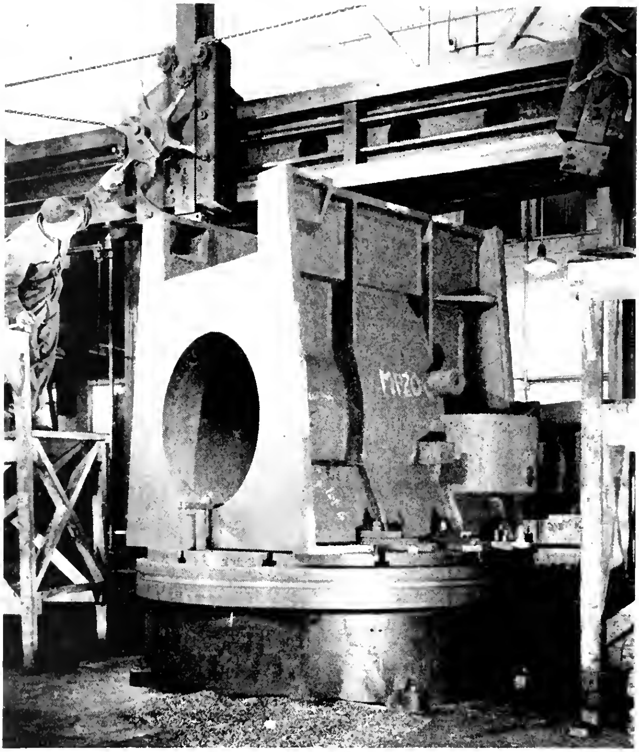
During the next four months the production schedule was stepped up, and personnel was increased to the point where the second 100 engines were delivered in four months and eight days after the first 100. On the first of last October the plant went on a schedule calling for the delivery of 30 engines each month—an average of better than one engine a day!

The responsibility of charting progress on this rate of 30 engines a month rests upon 100,000 tiny map tacks. These tacks, colored red, white, green, yellow and blue, are used on progress charts in the production control department, in the purchasing department, and in the shops.

Each engine is built of 15,542 parts, and the progress charts keep track of the condition and position of each and every part for every engine. A single glance at these charts tells

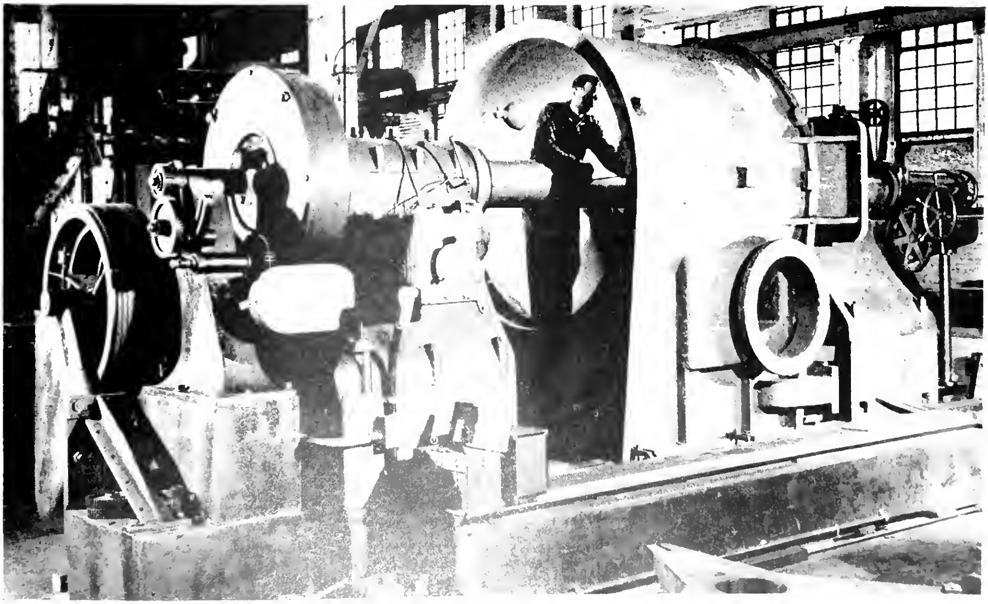
Stokers Marine Engines

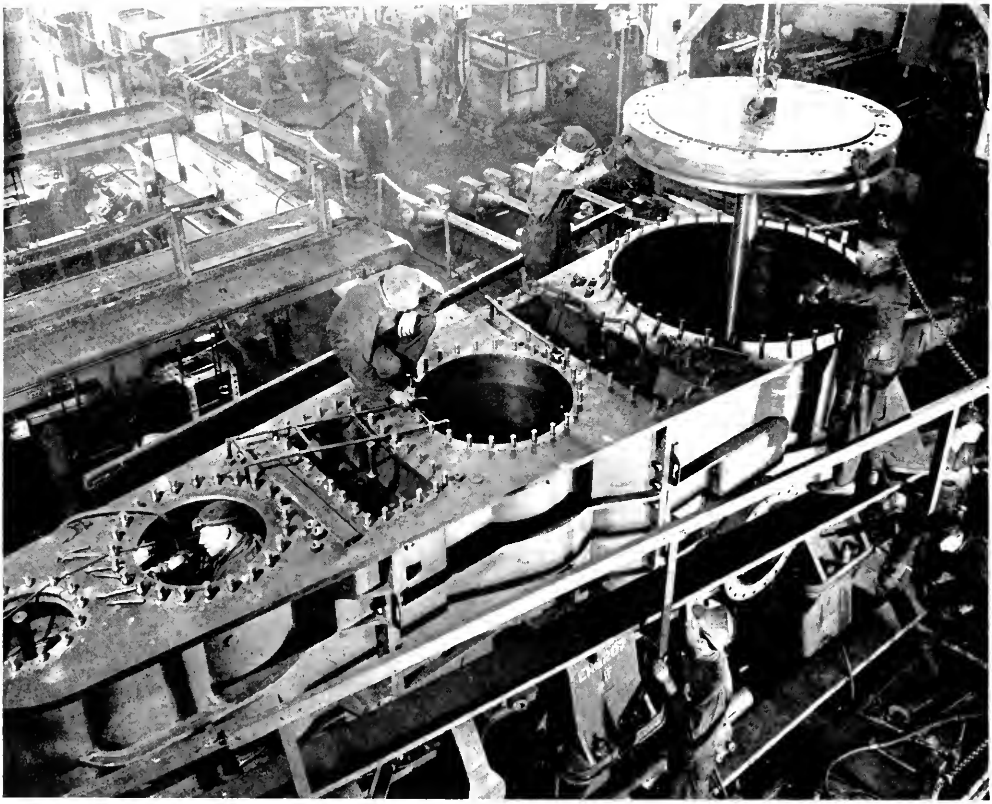
Dick Jones, company production man, what part may be missing for an engine scheduled for delivery on any given date. He has charge of scheduling all parts machined in the plant, and has two men under him who distribute material and record the progress of the parts on the boards. By going over these charts several times a day, he is able to schedule the work for all three shifts. When he sees a pin in a left hand column which is



Right: Machining the medium-pressure cylinder block.

Below: Machining the inside of the low-pressure cylinder on the triple-expansion marine engine. This cylinder has a bore of 70 inches and a stroke of 48 inches.





Lowering a piston head into the low-pressure cylinder.

not red (the color which indicates completion) he immediately schedules work on that part.

The charts map the progress of two months' production of engines. Across the top are the numbers of the engines, and on Chart No. One the scheduled delivery date. As yet no engine has missed being completed by the time this scheduled delivery date has arrived. Many engines have been delivered three days ahead of schedule.

Each chart is responsible for 722 items. The reason for not listing each individual part is that many are delivered as units For example, the 3941 quarter-inch hexagon nuts used in each engine are listed as one item on the chart.

Following is the legend for the color and meaning of the map tacks:

Red—Finished material ready to go into the engine.

Blue—Raw material such as rough castings and forgings.

White—Material in shop being machined.

Green—Material ready to be babbitted.

Yellow—Material in process of being worked on in outside shops of subcontractors.

Although the charts are not reproduced on these pages in color, it is easy to tell the color of each pin. At the extreme left (which indicates the engine nearest completion) the tacks are red. Next are white tacks, then green (used only for the few items to be babbitted), yellow, and finally blue.

Maintaining the Charts

All material received at the plant is shown on these progress charts within an hour after it is checked in. As the material comes in, receiving clerks write up duplicate tickets. These duplicate slips are sent to the progress department every half hour, and are immediately represented on the boards by a tack of their respective color. One man works the charts in the production control room, and another in the purchasing department. These two boards are checked against each other at least once a week.

Wayne Jensen, production engineer, has charge of supervising the recording of all material delivered. He has four men working on the charts in the production control room. All of this is done on the day shift, as almost all material is delivered during those hours.

One man spends full time keeping track of the yellow tacks, which show what material comes in and goes out to the subcontractors. Besides the six progress charts there are two additional charts which show the condition of the material of the subcontractors. On these charts the names

of the subcontractors are listed in the first column. The legend for these outside machine shop progress charts is: red indicates that the part has been delivered for the engine; green indicates that material for the part is in stock; and black is used to indicate material needed to complete the order.

There are also two boards in the machine shops which show the progress of the parts they are working on.

Iron Fireman furnish all of the engines for the Liberty ships built at Oregon Shipbuilding Corporation, but because they are able to build more engines than this record-breaking shipyard can use, they send surplus production to other shipbuilders. When one of these engines is dismounted ready for shipping it takes four flatcars to ship it.

The company are carrying on their production of commercial and industrial coal stokers at their plants in Portland, Cleveland and Toronto. Besides the marine engines, their war production includes airplane parts, machine gun mounts, and hundreds of items for Army Ordnance.

Right: Wayne Jensen, production engineer with the company, is in charge of the progress charts in the production control room.

Below: This is the way the Iron Fireman marine engines for Liberty ships are dismounted for shipping. It takes four flatcars to carry one of them.

Jack Hurley at his desk.

A Modern Ship Repair Plant

During World War I the Oakland estuary was called the "Clyde of America" because of the many building and repair yards for steel ships that were located on its shores. Among these was one built by a very practical wooden shipbuilder named Dan Hanlon—a man of great enthusiasm and energy—who secured: a title to some acres of mud flat; a contract from the Shipping Board to build eight steel ships; and a loan from his bankers to build shops, ways and docks. He put up his shops, secured enough machinery to operate them, laid down ways and soon had ships under erection. After the war was over he designed, built and installed the largest marine railway on the Coast.

Dan Hanlon had a good run of repair work for a while and built several lumber schooners. After his death, the General Engineering & Dry Dock Company acquired this plant and greatly improved it. There they built a number of ships for the Government and for private owners and did a large repair business. Then General Engineering decided to concentrate their shipbuilding activities at their Alameda plant, and for a time the old Hanlon yard was vacant.

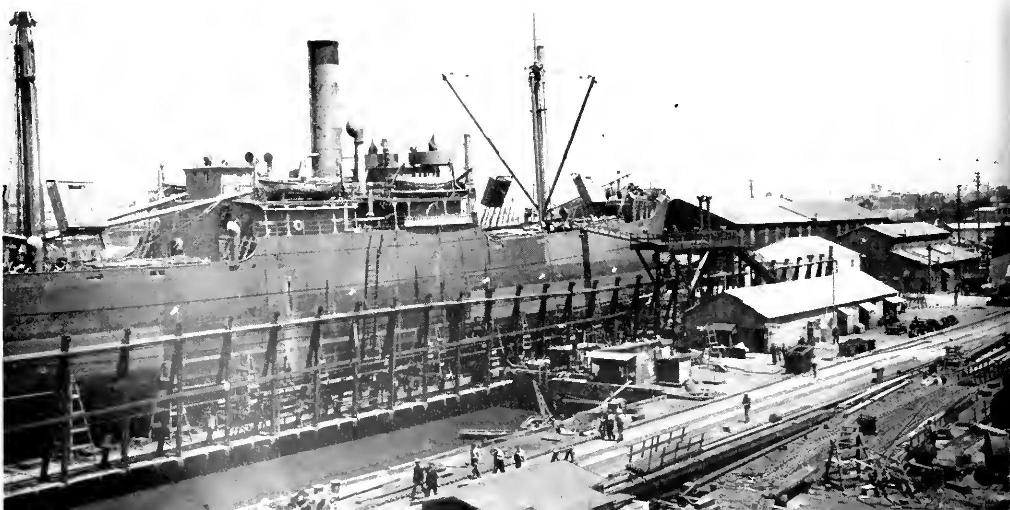
Today that yard is again throbbing with energy and has become a very important ship repair plant to serve the great war shipping effort. Since April, 1940, it has been known as the Hurley Marine Works, Inc., and under the "spark plug" leadership of Jack Hurley, president, and Herbert Magnuson, executive vice president, is making records in voyage and hull repairs on many merchant ships.

Jack Hurley is a native of California, born in Oakland in 1894, the son of John Hurley, who owns the Acme Boiler Works of Oakland. The younger Hurley served a machinist apprenticeship in his father's shop and was associated with his father for some years. In 1936 he formed a partnership, Hurley and Dow, machinists, with Lloyd W. Dow of Oakland. This was dissolved in March, 1940, and in April of that year Mr. Hurley took a lease on the present plant.

He tackled the job of modernizing this plant and at the same time repairing ships with characteristic energy. The plant is now about ready for real work, but during the past 3½ years a tremendous amount of real work has been accomplished.

The famous marine railway has

General view of yard, showing (left to right) a cargo steamer "up" on the marine railway, Machine Shop, Joiner Shop, and uncompleted Plate Shop. The depressed areas were formerly shipbuilding ways.

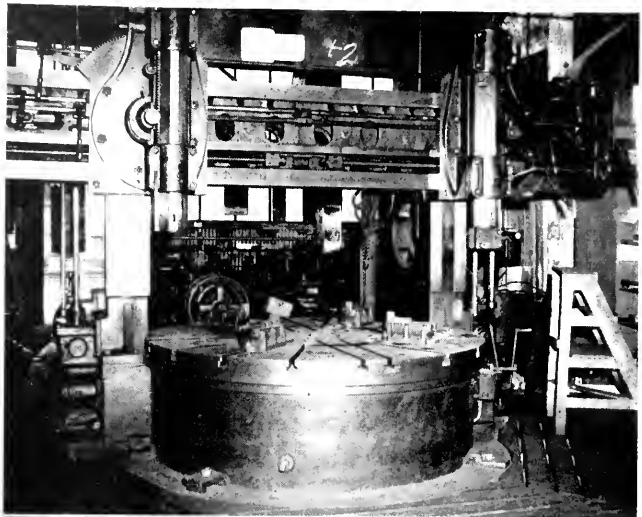


been completely rebuilt and its electrical hauling out machinery reconditioned. The yard has been completely paved and industrial rail trackage and crane tracks thoroughly overhauled. The administration building is modernized and enlarged and new sanitary equipment installed throughout the yard.

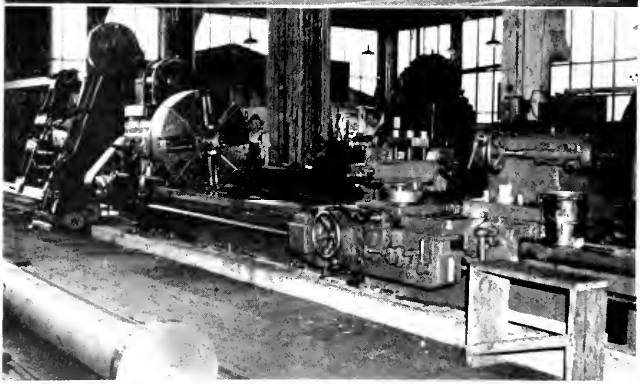
The machine shop lighting is modernized and a number of new and used tools installed. Several of these are shown in our illustrations. A new plate shop equipped with adequate fabrication machinery and cranes has recently been completed.

A new joiner shop is thoroughly equipped with the most modern woodworking machinery operated by competent mechanics. This shop not only takes care of all the joiner work in connection with the repair business of the yard but is kept continuously busy on job work for ship builders, such as large orders for mess tables and seats for Liberty type steamers.

Hurley Machine Works, Inc., is ready to tackle any hull or engine repairs for the average run of cargo or passenger vessel making San Francisco Bay a port of call.



A boring mill in the Machine Shop.



Right: In one corner of the Machine Shop are two huge engine lathes.

On the Ways—
SHIPS IN THE MAKING

SHIPS WORTH $500 MILLION

A wartime achievement of 145 ships worth $500 million, plus a new shipyard was announced yesterday on behalf of U. S. Steel's Federal Shipbuilding and Dry Dock Company at Kearny, New Jersey, by Lynn H. Korndorff, company president. He listed the ships silhouetted above. The new yard is at Port Newark, New Jersey, five miles from the Kearny plant.

Ships Worth 500 Million Dollars

Forty-seven destroyers head the fighting fleet costing 500 million dollars built since Pearl Harbor by U. S. Steel's Federal Shipbuilding and Dry Dock Company, it was announced early in December by Lynn H. Korndorff, company president.

The half-billion-dollars worth of ships consists of 145 craft, he said. From the Kearny yard came the 47 destroyers, besides four troopships, two cruisers, 12 combat cargo ships, two tankers and 12 fast freighters. Additional tankers and merchantmen would have been built had the war not prompted the yard to specialize in warships.

In addition, 36 Landing Craft Infantry and 30 destroyer escorts have been accounted for by the new yard constructed at Port Newark, New Jersey, since Pearl Harbor, and almost equal in size to the one at Kearny.

"No other organization can challenge this achievement of simultaneously constructing from nine different basic designs ships of such quality in two years," said Mr. Korndorff. "This is a record for speed in building a wide diversity of naval combatant and auxiliary ships, as well as high class merchant vessels.

"Bigger chapters are ahead. Additional types of ship construction have been scheduled for the yards. Their dollar volume in shipbuilding is to be boosted 20 per cent in 1944. We will carry through on this program with our same planned method of building ships.

"The system is a success because of experience gained over many years which has brought dexterity and coordination. It has been put to the toughest of wartime tests. A stream of changes in ship design and detail has followed new experience in combat, especially on the two types of destroyers built thus far at Kearny. These were made without delaying production. Thus was demonstrated the flexibility and versatility of an established system and organization."

Three Hundred Ships

A milestone in production had been reached at California Shipbuilding Corporation's yard when on December 9 the 300th vessel, the S. S. Philip C. Shera, slid down the ways at Terminal Island.

Mrs. Elizabeth M. Shera of Columbus, Ohio, christened the ship, named for her heroic husband, a marine engineer who sacrificed his life to save 44 shipmates, and who was awarded the U. S. Merchant Marine Distinguished Service Medal posthumously. He lost his life on May 5, 1942, when he ordered the engine room crew on deck after a torpedo struck the ship. He remained alone to answer the bridge signals, and a second torpedo hit the engine room, fracturing the steam pipes and killing him. His last act was to stop the engine, thereby permitting the remaining 44 survivors to launch lifeboats successfully.

Mrs. S. P. Patton of Hollywood, wife of Lieutenant Patton, U. S. Maritime Service enrolling officer for the eleven Western States, was matron of honor at the launching.

Twelfth Naval District Launchings

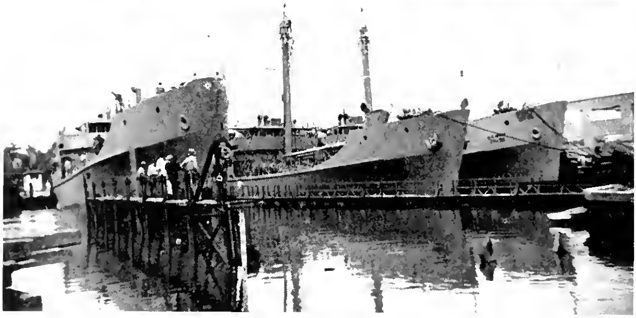
Among the current launchings of naval vessels in the Twelfth Naval District were the U. S. S. Spicewood, a net tender built at the Pollock Shipyard, Stockton, California, and launched on December 7; the U. S. S. Admiral W. S. Benson, a troop transport launched on November 28 at Bethlehem Steel Corp's Alameda yard; the U. S. S. Willmarth, a destroyer escort launched on November 21 at Bethlehem Steel Co's San Francisco yard; and the U. S. S. Safeguard, a salvage vessel built at Basalt Rock Company, Napa, and launched on November 20.

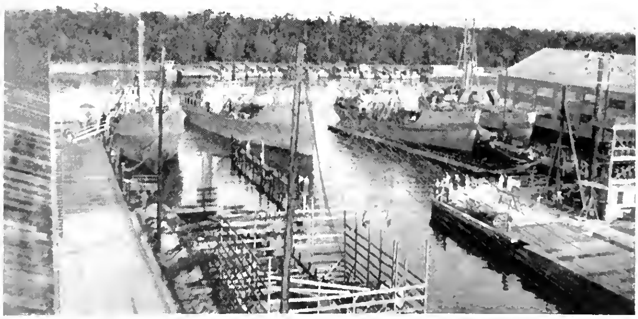
Partial December Shipbuilding Record

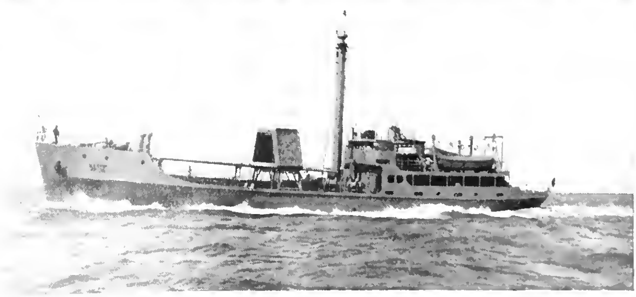
SHIPYARD	Deliveries No. of Vessels	Type of Vessel
Calship	19	EC-2
Calship	4	EC-1
Oregonship	16	EC-2
Richmondship—One	8	EC-2
Richmondship—Two	19	EC-2
Consolidated	3	C-1-B
Moore Dry Dock Co.	5	C-2
Western	1	C-3
Kaiser—3	2	C-4
Kaiser-Swan	7	T-2
Marinship	1	T-2
Kaiser-Vancouver	5	BB3
Consolidated	3	Frigates
Kaiser—4	1	Frigate
Concrete	1	B7
	—	
	95 ships delivered into service	

LANDING BOATS FOR THE ARMY

The illustrations show progress of construction at Higgins Industries, Inc., New Orleans, Louisiana, where landing boats for the army are being built. In the last picture is a 168-foot retriever cargo vessel built by the yard.







New 250 Club Member

For delivering more than 250 ships for the Victory fleet, the Bethlehem-Fairfield Shipyard, Inc., Baltimore, Md., has been awarded the Maritime 250 Club pennant. This is the fourth shipyard to become eligible for membership in the club. The 250th ship launched from this yard was the S. S. James C. Cameron.

The U. S. Maritime Commission's Board of Awards also has conferred on the Western Pipe and Steel Company, San Francisco, a gold star for its Maritime "M" flag for continued achievement in merchant vessel construction.

100th Liberty Launched

Honoring the memory of the famous United Press war correspondent, the S. S. Webb Miller, the 100th Liberty ship to be built by New England Shipbuilding Corporation, So. Portland, Me., affiliate of Todd Shipyards Corp., was launched on December 5 and sponsored by the writer's widow, Mrs. Mary Miller.

Webb Miller reported four major wars from the time he joined the Chicago American in 1912 as a police reporter until his accidental death during a London blackout in 1942.

Calship's Seagoing Broom

Calship's seagoing broom went into retirement recently after a life history no other broom in the world has equaled.

The story starts back in England when they used to hoist a broom to the mast of a ship returning from a successful trial run down the Thames to let the shipbuilders know they had made a "clean sweep" of their job.

Time skips by until February, 1942, when the "Clean-Sweep Broom" was taken aboard the John C. Fremont in her locked stores. All would have gone quietly, and she would have been eventually discarded at sea from the Fremont, except that Assistant General Manager A. O. Pegg felt that things should be done properly. If the broom should be tied to the masts of ships concluding successful trial runs, then the John C. Fremont

must have a broom; so they broke the lock on the box in which brooms were kept, and our heroine, the "Clean-Sweep" broom, kept her rendezvous with destiny. Hard-working days were ahead aboard each successive trial run and souvenir hunters wore down the plump broom to the protective stitching put down almost to her sweeping edge. She became more weather-beaten and notched on each trip, but stuck it out until the trial run of the Albert Ryder, Calship's No. 250. Now she has gone into retirement, gloriously attired with red-white-and-blue ribbons around her handle, in a specially-built glass-topped case. She is to be sent to Admiral Emory S. Land as a rare gift from Calship—the first and probably the only broom ever to signify 250 ships built, launched, tested and delivered in so short a time.

November Record

The President's directive for 24,000,000 deadweight tons of merchant shipping to be built during 1942-43 has been exceeded by more than one million deadweight tons, with the December production record yet uncounted, the Maritime Commission stated when announcing that the November production was 1,692,763 deadweight tons. This brought the total since January 1, 1942, to 25,284,387.

The bulk of the November deliveries were Liberty ships, 87 being completed. Other of the 164 total were 19 standard Maritime Commission tankers, 17 emergency tankers, 16 C-type cargo ships, nine frigates, four aircraft carriers, four concrete barges, three seagoing tugs, two tank carriers, one transport, one private coastal tanker, and one ore carrier.

The percentage of deadweight tons produced by the various yards were:

	Vessels	Percentage
Pacific Coast	78	46%
East Coast	48	33.27%
Gulf Coast	31	19.35%
Great Lakes	7	1.46%

The number and types of vessels built by all the yards follows:

SHIPYARD	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.	3	Tankers
American Shipbuilding Company, Cleveland, Ohio	1	Frigate
Barnes-Duluth Shipbuilding Company, Duluth, Minn.	1	Coastal Tanker
Barrett & Hilp, San Francisco, California	1	Concrete Barge
Bethlehem-Fairfield Shipyard, Inc., Fairfield, Baltimore, Md.	20	Libertys
Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Md.	3	Tankers
California Shipbuilding Corp., Wilmington, California	11	ET-1 Tankers
Concrete Ship Constructors, National City, California	2	Concrete Barges
Consolidated Steel Corporation, Ltd., Wilmington, Calif.	3 3	C-1 Cargo Frigates
Delta Shipbuilding Company, Inc., New Orleans, La.	6	ET-1 Tankers
Globe Shipbuilding Company, Superior, Wis.	2	Seagoing Tugs
Great Lakes Engineering Works, Ashtabula, Ohio	1	Ore Carrier
Gulf Shipbuilding Corp., Mobile, Ala.	2	C-2 Cargo
Houston Shipbuilding Corporation, Houston, Tex.	7	Libertys
Ingalls Shipbuilding Corporation, Pascagoula, Miss.	2	C-3 Cargo
J. A. Jones Construction Co., Inc., Brunswick, Ga.	4	Libertys
J. A. Jones Construction Co., Inc., Panama City, Fla.	2	Tank Carriers
Kaiser Company, Inc.—Richmond No. 3, Richmond, Calif.	1	Transport
Kaiser Cargo, Inc., Richmond, Calif.	1	Frigate
Kaiser Company, Inc., Swan Island, Portland, Ore.	5	Tankers
Kaiser Company, Inc., Vancouver, Wash.	4	Aircraft Carriers
Marinship Corporation, Sausalito, Calif.	1	Tanker
McCloskey & Company, Tampa, Fla.	1	C-1 Cargo
Moore Dry Dock Company, Oakland, Calif.	5	C-2 Cargo
New England Shipbuilding Corporation, South Portland, Maine	8	Libertys
Oregon Shipbuilding Corporation, Portland, Oregon	14	Libertys
Pendleton Shipyards Company, Inc., New Orleans, La.	1	Seagoing Tug
Pennsylvania Shipyard, Inc., Beaumont, Texas	2	C-1 Cargo
Permanente Metals Corporation, Richmond, Calif.	26	Libertys
San Jacinto Shipbuilders, Inc., Houston, Texas	1	Concrete Barge
St. Johns River Shipbuilding Company, Jacksonville, Fla.	4	Libertys
Southeastern Shipbuilding Corporation, Savannah, Ga.	4	Libertys
Sun Shipbuilding & Dry Dock Company, Chester, Pa.	6	Tankers
Walsh-Kaiser Company, Inc., Providence, R. I.	2	Frigates
Walter Butler Shipbuilders, Inc., Superior, Wis.	2	Frigates
Welding Shipyards, Inc., Norfolk, Va.	1	Tanker
Western Pipe & Steel Company, San Francisco, Calif.	1	C-3 Cargo

Running LIGHTS

Who When Where

Edited by B. H. Boynton

Capt. A. B. Court, Chiet of the Navy Inspection Bureau, 12th Naval District.

"Finest Christmas Gift"

Another San Francisco Bay area plant that has earned the high-prized Army-Navy "E" award for excellence of urgently needed war production is the Emeryville plant of Plant Rubber & Asbestos Works. At the ceremony, Capt. A. B. Court, Chief of the Navy Inspection Bureau, 12th Naval District, addressed the members of the organization upon conferring the award to the firm, along with comments on the award by R. H. Shainwald, president of the firm, who said:

"Few people realize how difficult it is for any manufacturing organization to win the award. That we have been able to meet the high standard of production performance demanded for the pennant is a source of deep pride to every member of our organization."

Manufacturing a revolutionary new type of precision molded heat insulating material, the Emeryville factory of Plant Rubber & Asbestos Works has been working on a 24-hour, 7-days-a-week schedule ever since Pearl Harbor. According to Shainwald, "We are equally proud of the fact that our product is saving thousands of pounds of 'deadweight' on naval ships and providing a heat insulation efficiency that is so essential."

Saverite Engineering's Expansion Program

William H. Rudy, Pacific Coast Manager.

Saverite Engineering Company, manufacturers and distributors of "Xzit" fire scale and soot eradicator, "Brickseal" refractory coating and other protective products for both the marine and industrial fields, has increased its production facilities in the Western territory through the acquisition of a modern plant and office building situated in the heart of the Los Angeles area—5800 South Hoover Street, corner of Slauson Avenue.

The plant occupies 30,000 square feet and new mechanical equipment has been designed and installed, enabling production of the firm's products on a vastly increased scale, thus keeping pace with expanding marine and industrial requirements of the entire Pacific area trading range.

A feature in connection with this new plant is that the property is located on the Santa Fe railroad spur track, a feature which aids greatly in the receiving of raw materials and the shipping of finished products in carload lots.

William H. ("Bill") Rudy, Pacific Coast manager of the organization, points with pride to the completeness of the firm's Pacific territory sales and service branch offices. Their offices are in Fairbanks, Juneau and Sitka, Alaska, the Materials Processing & Engineering Co.; Vancouver, B. C., the Service Engineering Ltd., 904 Birks Bldg.; Honolulu, T. H., The Lynch Co.; Seattle, Washington, W. H. Rober, 1016 First Ave. South; Portland, Oregon, K. B. Bonsall, 1233 S. W. 12th Street; Chico, California, Don Buckman; San Francisco, California, the Marine branch at Cordes Bros., 200 Davis Street, and the Industrial branch at Walter Harris, 200 Davis Street; Los Angeles Harbor, J. M. Costello Supply Co., 221 No. Avalon Blvd., Wilmington; for railroad and industrials at Gene Rainville, 5800 So. Hoover Street, Los Angeles; and the Export Department is located in Los Angeles at A. Chorover, 5800 So. Hoover Street.

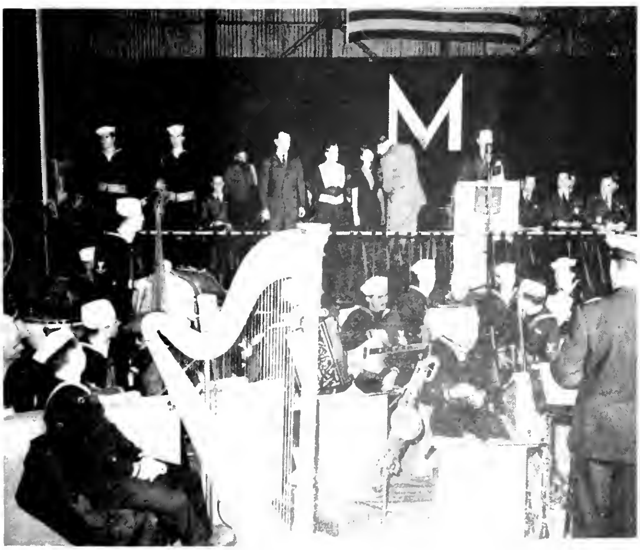
Below: Western Division headquarters of Saverite Engineering Co., Los Angeles.

In Russia everybody fights the Axis—even this 13-year-old lad, junior crewman on a Soviet ship docked for repairs at Seattle-Tacoma Division of Todd Shipyards Corporation. Here he's carrying work gloves aboard, for use of his shipmates. Russian youngsters learn their jobs the practical way, are commonly found in crews of ships docking at Todd yards.

Phelps Dodge Tube Division Receives "M" Award

Mr. C. W. Eliason, Regional Director of Industrial Relations, U. S. Maritime Commission, Oakland, California, paid tribute to the men and women of the Los Angeles Tube Division of the Phelps Dodge Copper Products Corporation, with the presentation of the Maritime "M" Award of Merit and the Victory Fleet Flag and individual merit badges to all employees at the corporation's plant in Los Angeles, on December 10th.

Mr. Eliason forcibly brought home to all the assembled employees the importance and magnitude of the shipbuilding program on the Pacific Coast and dwelt in some length on the significance of their contribution in supplying vital material to expedite this ever-growing program.



After the pennant was raised, Mr. Eliason then presented the Maritime Labor Merit badges.

John B. Hughes, noted news commentator, acted as Master of Ceremonies. The United States Coast Guard Band of the 11th Naval District, led by Chief Musician Jimmy Greer, played appropriate music throughout the dedication.

The plant is the only one of its kind west of the Mississippi River. In operation slightly more than one year, it turns out seamless brass and copper tubing and condenser tubes for the United States Maritime Commission and the Navy. Its products also are used in the manufacturing processes of 100 Octane gasoline and synthetic rubber.

Rear Admiral Harold G. Bowen, USN, turning over the management to John D. Reilly, president of Todd Corporation.

West Coast Yard Changes Hands

Recent assignment by the Navy of the Los Angeles Shipbuilding and Drydock Corporation to Todd Shipyards Corporation resulted in the transfer of some of the "key" men at Todd Erie Basin Dry Docks, Brooklyn, and the Todd Hoboken Division, Hoboken, N. J., according to an announcement by John D. Reilly, president of the Todd Shipyards Corporation.

Fred D. Hesley has been appointed general manager, under Navy Supervision, of the Los Angeles Shipbuilding and Drydock Corporation, situated at San Pedro, California, and has been succeeded as general manager at Todd Erie Basin Dry Docks by J. William Jamin, formerly head of the Hoboken Division.

Others appointed to the Los Angeles plant include Ross W. Copeland, former general manager of Houston Shipbuilding Corporation, as assistant general manager in charge of shipbuilding; Herman Minikine, former superintendent of repairs at Todd Erie Basin, as assistant general manager in charge of repairs; Joseph J. Redington, who served for years in the Navy's Construction Division, as special assistant to the general manager; Charles A Lane, of the New York Office, as administrative assistant; W. G. Abernathy, also of the New York Office, as head of the Accounting Department; and Arthur Sewall, as yard representative in customers' relations.

Two Well-known Firms Merge

The Wade Manufacturing Co. and Woodruff & Edwards, Inc., two long established firms, have now joined forces to maintain a new source of supply for plumbing drains, marine fittings, and similar specialties. The new organization will be known as the Wade Manufacturing Co., Division of Woodruff & Edwards, Inc., with main offices and plant at Elgin, Illinois.

A complete sales organization has been established, with representatives in all principal cities.

Among the recent Moore Dry Dock promotions (left to right), Edward J. Schneider has been appointed to the post of Senior Estimator; Clyde L. McKinsey, as assistant estimator; and Theodore J. Clark, the third of the three appointments in the estimating department.

Refrigeration on Our Fighting Ships

"There is no better way to underscore the importance of refrigeration on United States fighting ships than to compare Navy rations 100 years ago with those of today," R. L. Tomlinson, manager of the Marine Division of Carrier Corporation, stated recently. And, from this line of thought we see that in 1842, the Navy ration was "improved" over the one formerly served, as quoted from a service document:

"One pound of salted pork with half a pint of dried peas and beans; or one pound of salted beef, with half a pound of flour, and a quarter of a pound of raisins, dried apples, or other dried fruits; or one pound of salt beef with a pound of rice, two ounces of butter, and two ounces of cheese; together with fourteen ounces of biscuit; one quarter of an ounce of tea, or ounce of coffee, or one ounce of cocoa; two ounces of sugar; and one gill of spirits; and a weekly allowance of half a pound of pickles or cranberries, half a pint of molasses, and half a pint of vinegar."

This can be compared with the following typical menu served now aboard a battleship on a weekday:

Breakfast—Chilled fresh oranges, assorted dry cereals, milk-baked pork sausage, creamed diced potatoes, apple cake, bread, butter and coffee.

Dinner—Cream of split-pea soup, pot roast of beef with brown gravy, oven-baked potatoes, steamed string beans, marble cake, bread, butter, coffee or tea.

Supper—Boiled spaghetti with fresh meat balls, Spanish sauce, steamed succotash, hot spiced beets, fresh hermits, bread, jam and cocoa.

Actually more than one-half of the 10,000 to 12,000 pounds of food consumed daily aboard a modern battleship is taken from cold storage. The freezers aboard ship are primarily to hold meats, fish, poultry and butter. The chill rooms hold such items as fresh vegetables and fruits, eggs and cheese. Modern ships maintain low enough temperatures in at least one compartment to carry quick frozen fruits and vegetables. Also, refrigeration permits the manufacture of ice cream and maintenance of soda fountains where the bluejacket can obtain ice cream sodas and the like.

Above, right: On a destroyer escort at "chow time." The well ventilated forecastle becomes a mess hall. The crew always has hot food—and lots of it. Below, left: Refrigeration machine in operation aboard a U. S. Navy ship.

OBITUARY

Following a seven weeks' illness, death claimed Lieutenant Commander **Francis R. Shoemaker,** USNR, president of the State Board of Pilot Commissioners, on December 15, in the Marine Hospital, San Francisco. He was 64.

A graduate of the U. S. Coast Guard Academy in the class of 1898, Commander Shoemaker was assigned to make a survey of the Alaska coast. He remained with the USCG until 1907. During World War No. 1, he served in the submarine service.

In 1942, Governor Olson named him a member of the Pilot Commission.

Commander Shoemaker was a director of the Army & Navy Club and the Veterans of Foreign Wars. He is survived by his widow, Myra; a daughter, Alice S. Shoemaker, and a son, Francis R. Jr., USA.

Interment was in the Golden Gate National Cemetery.

Festive Spirits abound with Richard Glissman as Santa Claus and the "Three Eves" entertaining at the Mariner's Club luncheon.

S. F. Propeller Club's Yule Party

Serious business of war and shipbuilding and the festive mood of the holiday season shared honors at the annual installation of officers and Christmas party of the Propeller Club of the United States, Port of San Francisco, held at the St. Francis Hotel, December 15. Fred L. Doelker, vice president of the Grace Line and a widely-known figure in Pacific Coast shipping circles, assumed the presidency for 1944, before a tremendous gathering of shipping and shipbuilding representatives attending the party.

A newsworthy item was announced at the meeting by Carl W. Flesher, West Coast director of the U. S. Maritime Commission and guest speaker, when he stated that the shipyards of the West Coast produced 46 per cent of all ships built for the Commission in all shipyards of the country in November.

Fred Doelker paid tribute to the maritime world for its contribution to the war effort in turning over its tonnage to the Government and to the shipyards for their world record construction of tonnage on the West Coast.

"Turkey Feed" of Mariner's Club

The Mariner's Club of California held its annual Christmas luncheon on December 17, at the El Jardin Restaurant, San Francisco. Special attractions at the party were Santa Claus, played by Richard Glissman, and the "Three Eves," a feminine musical trio whose entertainment with the accordion, guitar and bass fiddle really put the large gathering of deep sea sailormen into a merry, merry yuletide spirit.

During the program the President, Frank dePue, mentioned the shortage of cigarettes for the boys at the Oak Knoll Naval Hospital and the assemblage responded to the fund to the tune of $90.

Enterprise Opens Eastern Office

In order to extend still further service to Government and commercial activities on the Atlantic Seaboard, C. G. Cox, vice president and general manager of the Enterprise Engine & Foundry Company of San Francisco, announced the appointment of E. H. Davis as manager of the new Eastern District office opened at 44 Wall Street, New York City.

The staff, from left to right: Robert Stickel, chief erecting engineer; Miss H. McPartland, secretary; Mr. Davis, district manager; Harry Huxford, service department; George Johnson, field engineer.

WHO'S WHO afloat and ashore

Edited by Jerry Scanlon

A Hero Receives Appointment

For valor a radio operator, whose heroism helped save the entire crew of a torpedoed American tanker, has won an appointment as a cadet-midshipman to the U. S. Merchant Marine Cadets Corps and also was awarded the Merchant Marine Distinguished Medal by President Roosevelt.

He is **Kenneth W. Maynard** of Bellingham, Washington. While he was serving on the S.S. China Arrow in the Atlantic, two torpedoes crashed into the ship's main tanks. The explosion blew large quantities of oil cargo into the air and, as it rained back on the ship, it ignited and the entire open space blown through the aft deck became a blazing inferno.

Orders to abandon ship were sounded when it was seen that the submarine was preparing to shell the flaming vessel, but the Master and Radioman Maynard remained aboard and set up a makeshift antenna and emergency short-wave transmitter to replace the one wrecked by the explosion. In this way they summoned help, working furiously for forty-five minutes after the call had gone out "blind" as the radio receivers were also wrecked. The shore stations fixed the tanker's position and within fifty-six hours after the vessel had been hit the entire crew was rescued.

Attempted Scuttling of APL Liner

A story has just been revealed by Mrs. Clara G. Cain, stewardess on the APL liner President Harrison, how the skipper, disregarding frantic signaling and momentary bombing by a Jap plane, refused to stop his ship and crashed the vessel into rocks at full speed ahead in the waters of the Yellow Sea.

While performing part of their strategy to scuttle the ship, the vessel was seized and salvaged by the Japanese. However, the refusal of the President Harrison's master to stop and his act of piling the liner on the rocks caused a delay of months before the vessel was ready for service.

Appointed as Director of Sales

Henry Valve Company of Chicago announces the recent appointment of Elmer H. Culver as Director of Sales. In his new capacity, Mr. Culver will supervise promotion and sales of the complete line of Henry valves, fittings and accessories for the air conditioning and refrigeration fields, and will also direct the sales activities of the company's aviation division which concentrates on production of solenoid operated fuel and oil line valves.

Mr. Culver is well-known in the field which the company serves, having been associated with the air conditioning and refrigeration industries throughout the past twenty-five years, holding key sales posts with Servel Inc., Westinghouse and the Norge Division of Borg Warner.

ELMER H. CULVER
of Henry Valve Company.

Sudden Passing of Captain Sutton

A heart ailment, aggravated by war duty, brought death suddenly to Captain Edgar Stacy Sutton, December 22, at the Marine Hospital, San Francisco.

Captain Sutton held the rank of Lieutenant Commander in the Navy. For sixteen years he was skipper on American - Hawaiian freighters and enjoyed a wide acquaintance, not only on the Pacific Coast and New York but also in the Far East ports. He had lived in Hongkong when he was in command of a British coastal freighter.

Captain Sutton was skipper of a vessel attacked at Darwin last August by Jap planes, but accurate fire of his gun crew sent the Nips whirling to their doom.

The popular shipmaster was 55 years of age. He made his home at Albany, California, with his widow, Floss. He was an active member of the Master Mates and Pilots.

Attorney General Robert Kenny has ruled that merchant seamen of vessels which enter California waters are subject to provisions of the California Unemployment Insurance Act. The decision followed a request from Homer W. Buckey, chairman of the California Employment Stabilization Commission.

SHIPPING PERSONALITIES

Captain C. P. Nash, well-known American - Hawaiian skipper, who holds the rank of Commander in the Navy, is on the bridge of the famed liner Yale. This liner was recently put into service and is now acting as an escort ship. The gallant vessel is doing her second "hitch" in war service. She made history with her sister-ship, the Harvard, as a troop carrier across the English Channel in the First World War.

Captain Walter Beckwith, veteran Pacific Coast shipmaster, who has been on the bridge of one of the larger carriers delivering supplies to our fighting heroes in South Pacific ports since Pearl Harbor, and whose log is replete with feats of seamanship, has just been discharged from the Marine Hospital in San Francisco.

The skipper has been navigating ships in and out of the Golden Gate for the past thirty-three years and states that he will be on deck again just as soon as an ailment, aggravated by long watches on deck, is cured.

Ernest J. Bradley, on loan to the Government by Matson Navigation Company, has arrived in London to assume his post as assistant director of the War Shipping Administration. He held the same post in San Francisco. His place here has been taken by Felix Isherwood.

Captain William Hellsinger, who was formerly master on fast coastwise liners and later San Pedro pilot and was in charge of the nets at the approach to the Golden Gate, has been transferred to a South Pacific port. His rank is now a Lieutenant Commander USNR.

Marine Department Combustion Engineering

David M. Schoenfeld has been appointed Assistant Manager of the Marine Department of Combustion Engineering Company, in which capacity, as assistant to Vice President W. H. Armacost, he will have charge of proposal engineering, the development of technical data and special heat transfer equipment.

J. R. Kruse has been appointed Chief Engineer of the same department in charge of the execution of contracts together with development of design standards and will participate in development and research on marine equipment.

W. H. Groundwater has been transferred from the New York Office to San Francisco to become Resident Marine Engineer on the Pacific Coast.

Below: Genial Carl Sugar, newly appointed general manager of The Anchor Marine Supply firm.

HARADEN PRATT

Vice president and chief engineer, Mackey Radio and Telegraph Company, has been awarded the Medal of Honor by The Institute of Radio Engineers for distinguished service in the field of radio communication.

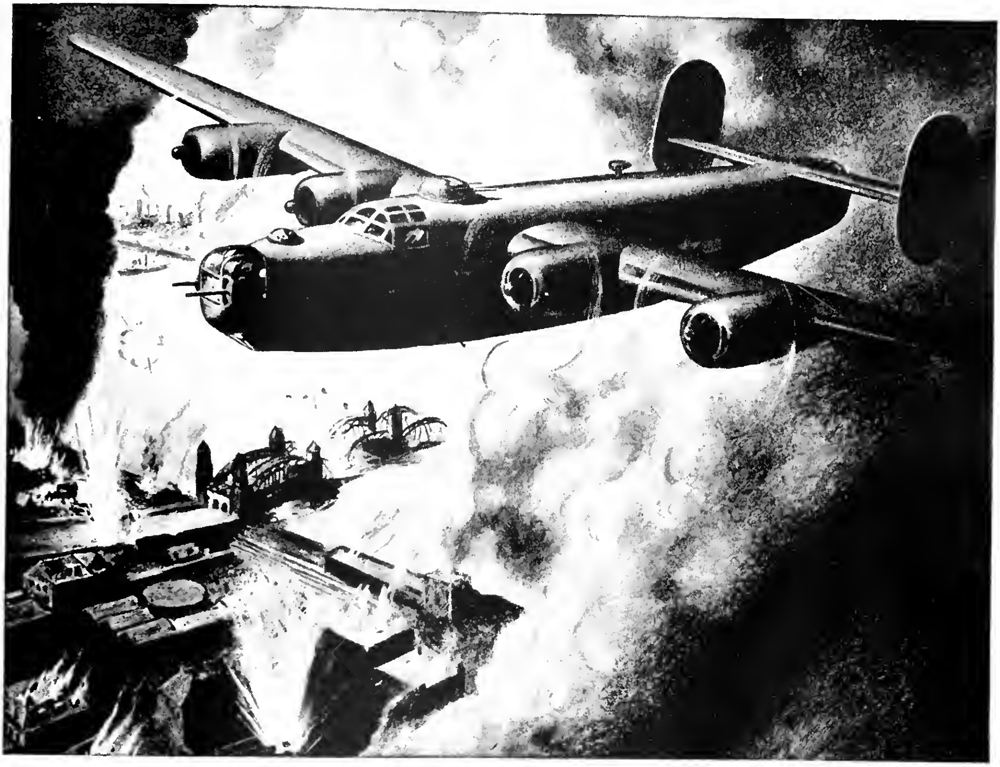
William A. McLean, one of the best known pursers sailing out of San Francisco, has been serving on troop carriers for the past two years out of an Eastern port, is now home in San Francisco for a month's vacation. His ship was lost by bombing, but only three members of the crew were lost. The vessel was in Mediterranean waters at the time. McLean floated for 30 hours in a life jacket before being picked up. His ship remained afloat for 24 hours.

General Manager Appointed

The Anchor Marine Supply and Manufacturing Company of San Francisco recently appointed **Carl Sugar** as general manager.

After graduating from the University of Southern California with degrees in business administration and law, he was Administrative Assistant at Calship, where he set up their first "on the job" training program, organized their materials control system throughout the yard and operated a rate control program. Later he held the position of Industrial Engineer at the Kaiser Iron & Steel Company in Oakland.

The company manufactures turnbuckles, shackles, bolts and nuts, and marine hardware; also does forgings and machine work.



R. L. Westmoreland, former senior hull inspector U.S.M.C. at Kaiser Co., Vancouver, Wash., is now hull inspection co-ordinator at Permanente Metals Corp., Yard No. 2, Richmond, California.

Port of Embarkation Awards

In recognition of contributions made by War Department civilian employees to the successful prosecution of the war, Major General Frederick Gilbreath, Commanding General of the San Francisco Port of Embarkation, recently presented the Emblem for Civilian Service to eight representative Port employees.

The ceremony, held in General Gilbreath's office at Fort Mason, was a token presentation signaling the award of this emblem to 6000 men and women workers entitled to it for successfully completing at least six consecutive months of satisfactory service with the War Department. The thousands not present at the ceremoney will receive their awards from the heads of Port divisions and operating agencies.

The emblem, a royal blue ribbon, bearing the device of the Army Service Forces—a blue star on a field of white, encircled with a scalloped border of red—is worn either on the left lapel or in approximately the same position as military service ribbons, was presented to seven men and one woman, whose records of Government service ranged from two to 37 years. They were: W. F. Krelle, Water Division, 37 years; Richard Smith, Overseas Supply Division, 35 years; Felix Chapman, Transportation Division, 34 years; Chief Tucker C. Beckett of the War Department Patrol, Provost Marshal's Office, 19 years; Allan Breslin, Personnel Division, 12 years; Miss Audrey Dauterman, Post Engineer's Office, two years; Theodore Grady, Transportation Corps Supply Division, two years; George C. McNicholas, Emeryville Ordnance Depot, two years.

Bronze Die Casting Company Appoints Sales Agent

Alan P. Cline, with offices at 116 New Montgomery, San Francisco, has been appointed sales representative for Bronze Die Casting Company. This concern manufactures the famous Albro Metal Pickling Chain which has revolutionized this part of the cleaning and galvanizing procedure. Because of the safety factor, this pickling chain eliminates danger of accident due to acids insidiously eating away the ordinary chain. The company has been specializing in the manufacture of special alloys for solving pickling troubles for nearly forty years and is recognized as a leading authority in the field.

Besides representing the above firm, Alan Cline represents C. M. Roestenburg & Son, Steel Valve Manufacturers; Rasmussen Iron Works, Plastic Division, makers of insulator parts for Jackson Electrode Holders and Arcturus Manufacturing Company, Drop Forgings; and Natomas Company who produce heavy fabrications.

L. J. Krumm, who is office manager of General Motor's Cleveland Diesel Division, is located at 111 Sutter Street, San Francisco.

Alan P. Cline, representative for Bronze Die Casting Company.

Noted Air Executive Passes

Maxwell Jay Rice, assistant vice president of Pan American Airways, Inc., died November 30, at the Presbyterian Hospital in New York. He was 43 years old.

After attending Yale University he began hs business career as European Director of Associated Tours, Inc., and assistant to the president of the Ansco Corporation of Binghamton, N. Y.

In 1928 he became associated with Pan American Airways, and subsequently served as South American regional director, as vice president of Compania de Aviacion Pan American Argentina, as vice president and general manager of Scadta, now Aerovias Nacionales de Colombia, and as president of Pan American's affiliate in Brazil, Panair do Brazil. In 1942 he was appointed assistant vice president.

Captain Field Retires

The Commandant of the U. S. Coast Guard recently announced the retirement because of physical disability of **Captain Richard Stockton Field**, USN, well known in shipping circles as Director of the Bureau of Marine Inspection and Navigation from 1937 to 1942, after which he served as Assistant to the Commandant and Chairman of the Merchant Marine Council when the principal functions of the Bureau were assigned to the Coast Guard.

Henry Dettmer, Assistant Hull Inspector, Moore Dry Dock Company, Oakland, California.

Violation of Censorship Code

For bringing nine personal letters to the United States as a "good deed" for a soldier pal stationed in Australia, a Federal Grand Jury in San Francisco indicted a merchant seaman. The seaman, **Gilbert Peter Anson,** was specifically charged with violation of the censorship code. The arrest and indictment followed complaints by the Army to the Department of Justice that this method of evading censorship was becoming widespread.

Tankers Named After Missions

Among the ships launched at Marinship Corporation, Sausalito, recently, were two tankers named after famous California Missions. On November 25 the S. S. Mission San Fernando was sponsored by Miss Ruth B. Krohn, with Miss Delma Powell as maid of honor; while on December 19 the S. S. Mission Santa Ynez was launched with Mrs. Ralph K. Davies as sponsor. The historical and beautiful campanile and cloisters of the Mission Santa Ynez, located 40 miles from Santa Barbara, are still in use today.

Quiz Kids at Launching

The launching of the S. S. Archer, a C-2 cargo ship at Moore Dry Dock Co., Oakland, California, on December 12, was high lighted by the presence of the Quiz Kids of radio fame. Sponsor of the vessel was Marilyn Moore, 9-year-old daughter of Joseph A. Moore, Jr., Moore president. As the sponsor cracked the bottle of champagne over the bow the five Quiz Kids held a line attached to the trigger of the ship, and their combined yank at the appropriate moment sent the ship slipping off its way. This was the first participation of these famous children in a launching program.

Keel-laying at Smith Shipbuilding Co.

Keel laying ceremonies for the first of a fleet of 16 new type 4000-ton cargo vessels was high lighted at a double launching of a modern frigate, the U. S. S. Brunswick, and a PC-1179 subchaser, at the shipyards of the Leatham D. Smith Shipbuilding Company, Sturgeon Bay, Wisconsin.

The 20-ton double bottom keel section of the first of the new freighters was swung onto the building berth occupied by the frigate Brunswick immediately after the vessel slid down the ways. These new cargo vessels will be the fourth of five various types of ships built in this Great Lakes shipyard. The freighters will be about 340 feet in length and 50 feet in beam, and will be single screw, diesel powered.

Launching the S. S. Cape Comorin

Mrs. Norman E. Branch, president of Ebell of Los Angeles, christened the S. S. Cape Comorin on November 23, when the huge C-1 cargo and passenger vessel slid down the ways at Consolidated Steel Corporation's Wilmington shipyard. Mrs. Charles A. Ballreich, Ebell's first vice president, acted as matron of honor.

The 67th vessel was named after the most southerly point in India, and among the spectators at the launching were hundreds of Ebell's employees attending the colorful launching ceremonies.

P. E. Allan, general sales manager of Tide Water Associated Oil Company, is shown here with two honored guests at the annual "Football Luncheon" at the San Francisco Advertising Club. Right is 81-year-old Amos Alonzo Stagg, famed mentor at College of the Pacific, and Stub Allison, University of California's popular coach.


CORDLEY
Electric
WATER COOLERS
Specially Designed for
Shipboard Use
CORDLEY

Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

Universal Cable Strap

The Universal cable strap, manufactured and distributed by Marinco, Los Angeles, provides a better, tighter cable assembly than any other method. Instantly adaptable to the many different combinations of various size cables in each ship installation, it has separate "saddles," as shown, which clamp individual cables uniformly with predetermined pressure, making them practically immovable.

With known cable sizes, proper size saddles are simply set in the channel of this strap, thus eliminating the necessity of setting up dies to form complete strap.

It requires less work to assemble and install the prefabricated parts of this strap than to make and install individual straps. Cables are clamped tightly, and there are no rejects on inspection due to loose cables.

There is no material wasted with this strap. In case of changes or replacements, every part is salvageable.

Universal cable strap.

Improved Underwater Cutting Torch

Victor Equipment Company, San Francisco and Los Angeles, is now introducing an improved underwater cutting torch, Model 3900.

The manufacturer claims that this improved design offers to divers the following added conveniences:

(1) The air mantle is so designed that it limits the annoying slagging of the tip and adjustments can readily be made under water without irretrievably losing parts.

(2) The gas control valves are so located and so designed that they can be more easily manipulated when the diver wears heavy gloves and operates in murky water.

(3) The torch will start the cut and will do the actual cutting with heretofore unaccustomed speed.

(4) The torch is more easily maintained in service and occasional reconditioning can be undertaken with a minimum of previous skill or special tools.

A comprehensive descriptive bulletin, with many excellent illustrations, is available to divers and engineers.

Model 3900 improved underwater cutting torch.

Preservation of Boottop Belts

International Paint Co. (Calif.) Inc. of San Francisco is distributing a folder on this subject, which should be of considerable interest to shipowners and operators.

This folder emphasizes the value of a properly designed primer, and while the recommended amount of priming and painting may appear excessive, it is justified in the light of the great number of new ships in service today and the corrosion which is so often evident on their wind and water belts. Stress is laid on the alternative effects on the primer of salt water immersion and atmospheric exposure, and particularly on resistance to water friction.

The manufacturers assert that much corrosion on new ships, which is visible on the hull above the waterline, is due to improper priming and painting. In many cases of corrosion the fault lies in the primer—in its incomplete drying resulting in film instability and subsequent cracking and detachment.

In Primekote Gray is embodied a combination of three of the most rust inhibitive pigments in a fast-drying waterproof vehicle. This primer affords complete thorough drying and hardening in less than three hours, this drying time varying but slightly due to weather and temperature changes. Primekote Gray is now used on boottop belts, topsides, decks and deck superstructures of a great number of ships where its unique qualities have received full recognition.

International's widely known "Supertrop" Antifouling is now furnished in a low visibility gray shade and is used to prevent fouling and retard corrosion on boottop belts of many ships running in tropical waters.

This firm, by use of recently developed "high oil absorption" pigments, is producing the standard shades of Low Visibility Grays with flat finishes, yet with much greater varnish or binder content than is otherwise possible. These flat finishes for exterior use are claimed to have a life approximating that of the full gloss hull grays in use prior to the war.

One point is of interest: the manufacturer emphasizes that one coat of a proper primer and one finish coat on boottop belts is better than two finish coats, even though the undersurface may appear well preserved.

Hot off the Press

CATALOGS OF TODAY BECOME TECHNICAL HANDBOOKS OF TOMORROW

The Inside Story of the Square D Company, Detroit, Michigan, is presented in brochure form and covers the research and development of the Square D program, showing the expansion in their research laboratories for electrical apparatus for material testing, analysis and scientific research. The company manufactures the Kollsman aircraft flight, navigational and engine instruments, and Sard optical equipment.

• • •

"Flexite Buckets," catalog section 9425, is a new bulletin on Flexite rubber pouring buckets for the safe and economical handling of acids, corrosives and liquid high explosives, and has just been issued by The B. F. Goodrich Company. It also describes Flexite rubber dippers, hard rubber funnels, and Anode Acid rubber gloves.

• • •

The Heat Treating Furnace gives a brief outline of the factors—tangible and intangible—which contribute to producing a good industrial furnace.

Whether a furnace is just a pile of bricks with a few gas pipes stuck in or whether it is a continuous unit, 300 feet long, utilizing a special generated atmosphere to harden alloy steel plates automatically and without surface scale or decarburization — certain fundamental principles govern its successful design, construction and operation.

The booklet is published by Surface Combustion, Toledo, Ohio.

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Industrial Trucks for War. To acquaint industry with their war-standardized line of electric industrial trucks, The Yale and Towne Manufacturing Company, Philadelphia Division, recently published this 76-page catalog. It is most complete and contains detailed descriptions of all models, as well as a great many application illustrations showing many uses of industrial power trucks.

A separate section is devoted to the workings of the War Production Board's Limitation Order No. L 112, as applied to Yale industrial trucks.

• • •

Cavalcade of Fighting Horsepower, a new booklet published by Caterpillar Tractor Co., Peoria, Illinois, gives a graphic portrayal of the part "Caterpillar" products are playing in World War II. Important chores on many fronts, including the Aleutians, Africa, Arctic, New Guinea, Great Britain, Mediterranean and New Caledonia, are pictured and described.

Cochrane proportioning equipment for corrosive fluids, Publ. 2985-A, describes an ingenious and simple method of proportioning sulphuric acid to water supplies. Accuracy is obtained without the use of any moving parts in contact with the corrosive liquid, giving long life and insuring very low maintenance charges. The principle of operation is described fully, with its many advantages and applications.

• • •

Racine variable volume hydraulic pumps and hydraulic valves is a new catalog put out by Racine Tool and Machine Co., Racine, Wisconsin, consisting of a series of clear, concise illustrations and descriptive matter pertaining to the company's line of pumps.

• • •

"A Message to the Man who would build 'em faster" is the title of a folder published by Joseph Kaszab Inc. of Chicago, Illinois, makers of marine furniture and ships' steering wheels and Kaszab prefabricated deck houses. The folder is illustrated to show the quality of their work in the marine field during wartime.

• • •

"Marine Signal Devices" is the title of a new publication by Edwards and Company, Inc., Norwalk, Conn., which describes and illustrates a large number of newly designed devices for marine uses, such as alarm annunciators, contact makers for alarm annunciators, watertight contact makers, watertight connection boxes, watertight dial light indicators, weatherproof buzzers, weatherproof marine horns, and the like.

• • •

Balco Products, a new catalog issued by Ballou Service & Instrument Co., New York City, shows their line of ball and socket joints, brackets, steam whistles, ship's bells, foghorns, gongs, mechanical telegraphs, and hardware and engine room instruments.

• • •

"Towers of Triumph" is the title of a brochure published by The Dayton Rubber Mfg. Company, Dayton, Ohio, makers of synthetic rubber. It answers common questions on the subject of synthetic rubber, and portrays the drama of this product and the milestones of progress the Dayton plant has made.

Pacific MARINE REVIEW

FEBRUARY 1944

Pacific Marine Review

Contents - - - - - February, 1944

MEMBER AUDIT BUREAU OF CIRCULATIONS

Official Organ

Pacific American Steamship Association

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Shipowners Association of the Pacific Coast

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Pacific MARINE REVIEW

The National Federation Of American Shipping

There has recently been formed, with headquarters at Washington, D. C., the National Federation of American Shipping, whose board of directors at their first meeting elected Almon E. Roth of San Francisco as president.

The new organization is a federation of five existing associations which comprise in their combined membership virtually all the ocean-going shipping of this country, including foreign trade, intercoastal, coastwise, colliers and tanker groups.

The following existing associations are included in the Federation:

American Merchant Marine Institute and the Association of American Steamship Owners, with headquarters on the East Coast; and the Pacific American Steamship Association, the Shipowners Association of the Pacific Coast, and the Pacific American Tankship Association, with headquarters on the Pacific Coast.

The eastern tanker lines for the most part are members of the American Merchant Marine Institute. These organizations comprise in their membership virtually all ocean-going shipping of the United States:

R. R. Adams, executive vice president, Grace Lines, Inc., New York City.

J. J. Halloran, vice president and general manager, Sprague Steamship Company, Boston.

Basil Harris, president, United States Lines, New York City.

B. B. Howard, general manager, Standard Oil Company of New Jersey, New York City.

Joseph T. Lykes, executive vice president, Lykes Brothers Steamship Company, New Orleans, La.

H. Harris Robson, vice president United Fruit Company, New York City.

H. W. Warley, president, Calmar Steamship Corp., New York City.

Henry F. Grady, president, American President Lines, San Fraancisco.

Frazier Bailey, executive vice president, Matson Navigation Company, San Francisco.

Charles L. Wheeler, executive vice president, McCormick Steamship Company, San Francisco.

A. O. Woll, general manager, General Petroleum Corp. of California, Los Angeles.

E. P. Farley, chairman of the board, American - Hawaiian Steamship Company, New York City.

E. Myron Boll, president, A. H. Boll & Company, New York City.

Edward A. Roberts, president, Waterman's Steamship Corp., Mobile, Ala.

Almon E. Roth, president, National Federation of American Shipping.

In order to accept the presidency of the new Federation, Mr. Roth will take a leave of absence as president of the San Francisco Employers Council. George O. Bahrs will serve as president of the Council during Mr. Roth's absence.

Mr. Roth's shipping background includes service as the first president of the Waterfront Employers Association of the Pacific Coast, and president of the Pacific American Shipowners Association. He formerly was associated with the legal firm of Pillsbury, Madison and Sutro of San Francisco; served as business manager of Stanford University; has been a trustee of Stanford University for several years; is a vice president of the California State Chamber of Commerce; served as president of Rotary International in 1930-31; presided over the International Convention in Vienna, Austria, in 1931; and took a prominent part in the development of international procedures and organizational aspects of Rotary.

In assuming his duties as president of the National Federation of American Shipping in Washington, D. C., Mr. Roth stressed the need for cooperative planning for the future of the American Merchant Marine. He said:

"The establishment of an adequate merchant marine in the period following the war involves many complex and difficult problems which call for immediate planning. We are in general agreement in this country that it is essential to the national defense and the restoration of our world commerce that we maintain an adequate privately-owned merchant marine.

"So far, however, there is no common agreement and insufficient information on such important details as the probable size of our merchant fleet, the terms upon which Government vessels eventually will be sold to private industry, the possible disposition of excess tonnage to foreign nations, the modernization of our existing vessels and provisions for new and fast vessels, and the promotion of the domestic and foreign commerce which will be required to support an adequate merchant marine.

"The tremendous job of re-establishing and expanding our merchant fleet to an adquate size is the joint responsibility of the Government and the shipping industry.

"Labor, which has done such a magnificent job in manning our American ships during the war, and the shippers who will supply the essential commerce, will also have a great stake in this program.

"The Federation is designed to provide an overall agency through which the entire ocean-going shipping industry of this country can cooperate effectively and intelligently with all other interested parties in working toward the solution of the problems involved in the reconversion of our maritime industry from a wartime to a peace-time basis. One of its first tasks will be to develop the facts and information upon which sound judgments can be based."

Your Merchant Marine

Synopsis of an address by Rear Admiral Howard L. Vickery, U. S. N., Vice Chairman of the U. S. Maritime Commission, before the Port of Portland, Oregon, Propeller Club of the United States, January 21, 1944:

Notwithstanding the seeming impossibility of the task, we have built since Pearl Harbor 2600 vessels, aggregating 27,000,000 deadweight tons total carrying capacity. Nearly half of these ships were produced in West Coast shipyards. Your own: Oregonship turned out 24 ships off 11 ways in a single month; Swan Island turned out more tankers per way per month than any other shipyard; Vancouver turned out an airplane carrier every six days.

The Liberty is the workhorse of this fleet. The Liberty building yards are merely the final assembly line of a nationwide plant. Some 5000 plants, located in almost every state in the Union, back up the shipyards. An intensely close control of every phase of production in all these plants has been essential to the schedule.

Along with the Liberty ships, we have been building the C-type of standard fast cargo carriers and many fast tankers. Now we are in large measure substituting the Victory type (a moderately fast cargo carrier) for the slower Liberty.

When the war ends, the U. S. merchant fleet will be the largest national fleet in world history, and will include enough ships of the finest types to implement whatever maritime policy this nation may choose to pursue.

We glory in the achievements of the U. S. Navy. But the Navy on a distant fighting front is helpless without an adequate merchant marine. The Navy only comes into vital use when the shooting begins, but we cheerfully support it on a continuous basis. Just so we should continuously support the Merchant Marine as an essential element in defense. The fact that the merchant marine can partly, and in some cases wholly, support itself in peace time should induce us to be the more cheerful in putting up the difference for lines requiring Government assistance in meeting foreign competition.

When it comes to disposition of the fleet to private ownership and operation, I believe that Congress should write off from the cost of the fleet all extras due to war conditions, and should allow us to sell these ships on the best terms possible to reliable American operators.

And what of the Liberty ships? True, we are mighty glad to have them today. But when the war is over they will not cease to exist, and undoubtedly the United States will have on its hands a fleet of emergency type vessels, alone comprising more tonnage than the largest pre-war merchant marine of any nation. We must face the fact that Libertys are altogether outclassed on routes where high speed is a major factor. Naturally, in both Government and industry, serious thought is being given to their peace time disposition, and various plans are under consideration. In the last analysis, however, a successful solution will require real public appreciation of the basic factors involved.

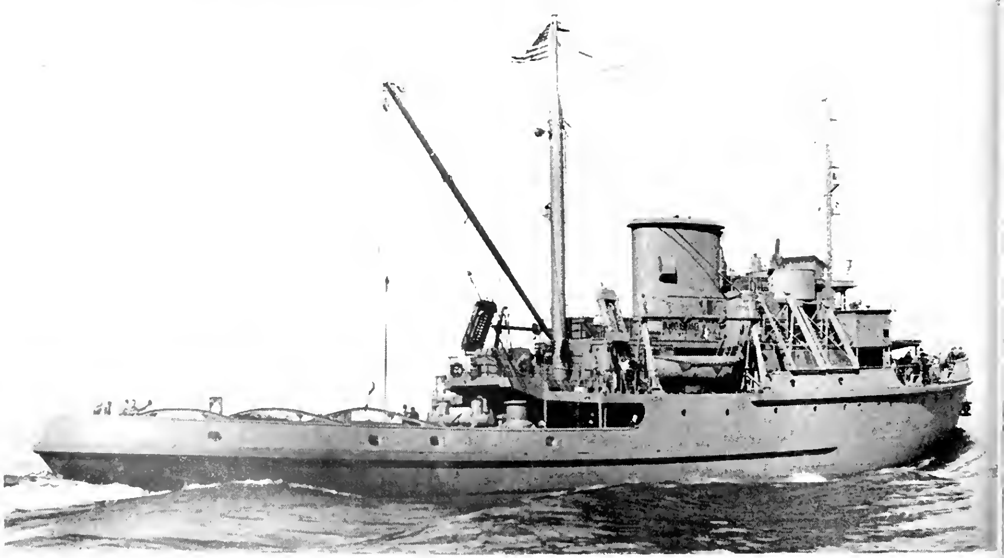
Most Geared

THE U. S. Maritime Commission has taken delivery in recents months of a fleet of vessels that rank among the largest seagoing tugs in the world. All of these vessels are diesel powered, all apply the power of a pair of diesel engines through electric couplings and mechanical gearing to a single propeller shaft, and all have arrangements for supercharging the engines.

This article has particular reference to eleven of these tugs, the engines for which were built by the Enterprise Engine and Foundry Company of San Francisco and were equipped with the Elliot-Buchi system of exhaust gas turbo-charging.

The general characteristics of these tugs are shown in the table herewith.

Above: Bow view of tug V4 at full speed. Below: Stern view from starboard quarter.



Powerful Diesel Tugs

MARITIME COMMISSION BUILDS FLEET OF GENERAL SERVICE TUGS WITH ENTERPRISE EXHAUST BLOWER SUPERCHARGING ENGINES

General Characteristics

Length Overall	194′–4″
Length between Perpendiculars	185′–0″
Beam Molded	37′–6″
Depth to Main Deck	21′–5″
Depth to Upper Deck	29′–2″
Draft Molded	15′–6″
Displacement	1603 tons
Specified Power	2205 hp
Test Power Supercharged	3000 hp
Sea Speed Normal	14 knots

The general arrangement of spaces and the structural arrangement are shown on the drawings that accompany this article.

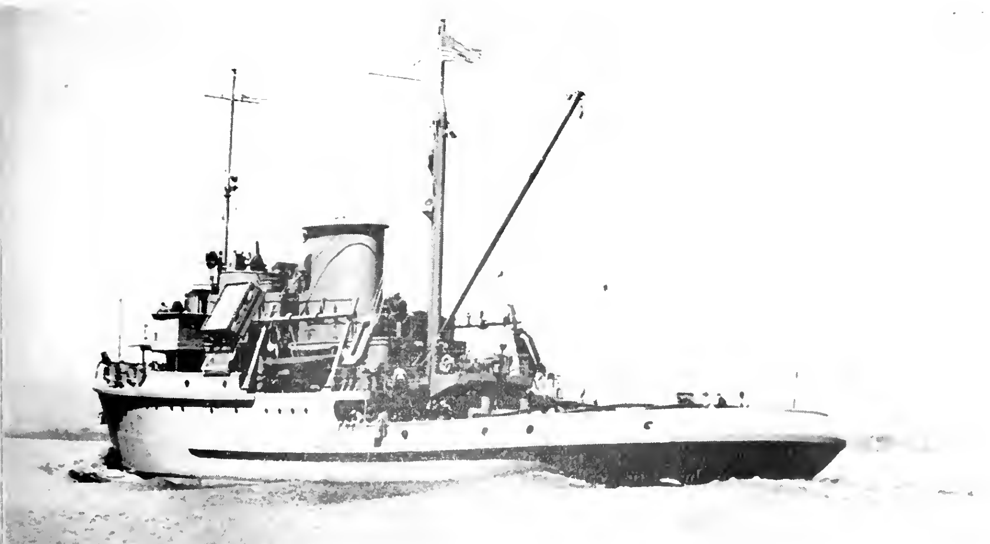
Carefully designed for seaworthiness, each hull has a raised forecastle above the main deck, forming an upper deck which extends from the stem to a line a little aft of the after bulkhead of the main engine room. Three forward bulkheads extend watertight to this upper deck and the five other bulkheads are watertight to the main deck.

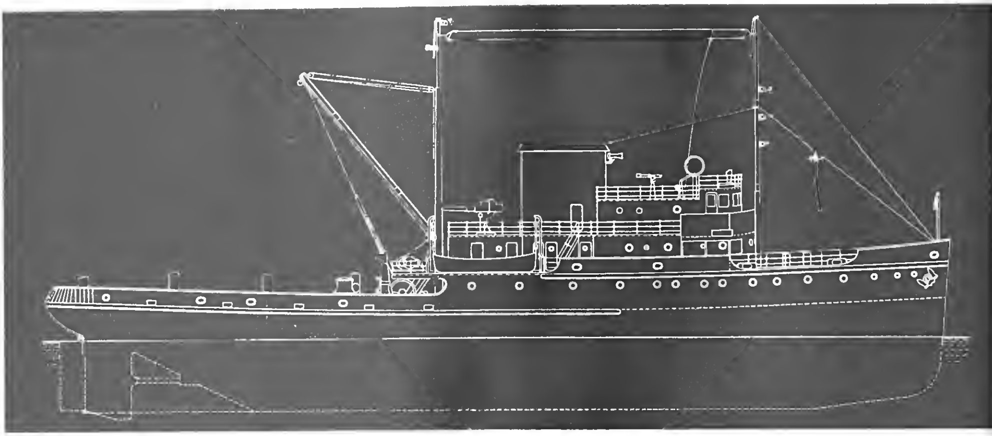
Extending from stem to stern, the main deck has approximately 75 feet of clear space aft for handling lines. Below the main deck is a platform deck from the chain locker aft to the forward machinery space. Thus the hull is divided into nine main transverse, watertight compartments by eight bulkheads, which, in combination with the deep double bottom extending from forepeak to after peak, produce a very safe and seaworthy enclosure and add greatly to the strength and rigidity of the structure.

It will be noted on the drawings that the double bottom tanks forward and aft of the main engine room are fitted for fuel oil bunkers, as is also the watertight compartment forward of the auxiliary engine room and below the platform deck, as well as the deep tanks port and starboard of the shaft alley. This provides a bunker capacity of 538 tons, and will give these tugs a tremendous cruising range. Fresh water tankage is provided under the engine room and in the after peak.

Officers' and crew's quarters are provided and furnished on a scale approximating that used on modern ocean-going cargo vessels. Ample refrigerated stores space serviced by the most modern types of machinery is installed in each hull. Ample mechancial ventilation is installed and living quarters are air conditioned. Sanitary features have been well designated and are serviced by competent and efficient mechanisms. Pro-

Stern view from port quarter.





Outboard profile of a V4 tug. The Kort nozzle is not shown.

vision is made for sleeping 37. Among these, three radio operators are on the bridge deck, eight deck and engine room officers are on the upper deck, and the balance are on the main deck. The galley, pantry, officers' mess and crew's mess are on the main deck in a very compact and convenient arrangement.

On the upper deck forward is a double-geared electric windlass for handling the anchor. Aft on this deck is an electric winch for servicing the 10-ton, 45-foot boom that is stepped on the mainmast. This deck has an overhang aft which shelters the Almon Johnson towing machine.

Of unusually large size and power, this towing machine has a drum capacity for 3000 feet of 2¼-inch wire towing hawser. Immediately aft of the towing machine is a 20-inch kevel bitt for fixed towing, and to starboard of this bitt a 36-inch electric capstan for handling lines. Two 18-inch kevel bitts at the bulwarks port and starboard aft on main deck and one 18-inch kevel bitt at the rail port and starboard on the upper deck forward complete the arrangements for attaching lines. Three arches are fitted across the main deck aft to carry the main towing hawser clear of the deck.

An electro - mechanical steering gear is located on a flat below the main deck and just over the rudder. An emergency tiller is arranged on the main deck, attached to an extension of the rudder stock. Steering by electric telemotor control is arranged for four stations, the wheelhouse, the bidge over wheelhouse, and port and starboard at after end of the upper deck.

Very complete navigating equipment and facilities are fitted on the bridge and upper deck. A Sperry Gyro-Compass is installed with repeaters at each steering station. Radio direction finder is installed over one of the repeaters in the wheelhouse. Complete transmission and receiving radio apparatus of the most up-to-date character is installed in a special radio room aft of the wheelhouse so that these tugs can keep in touch with practically any port or ship.

Power Plant

Complete as these designs are for the safety, comfort and efficiency of these tugs and their crews, it still remains eternally true of any tug, as Berton Brayley says in his poem on this subject, that, "There's nothing much to her but her power plant."

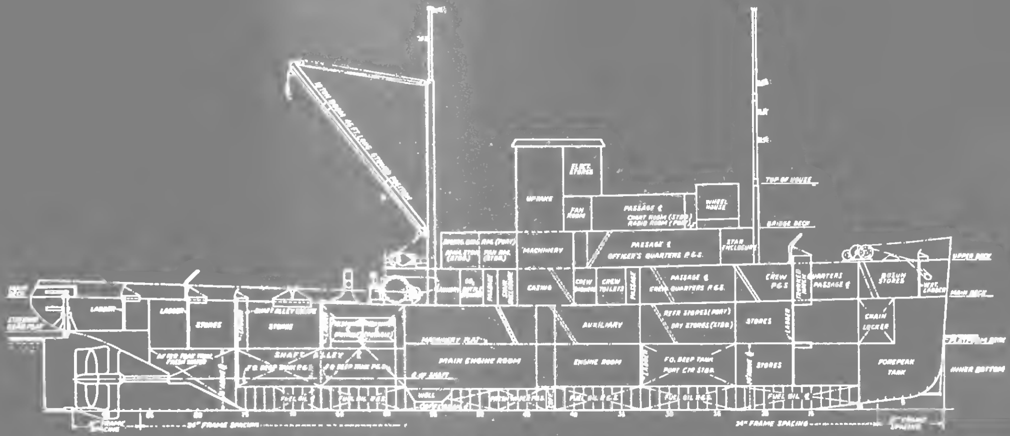
The power plant of the V4 Maritime Commission tugs is located amidships in two engine rooms separated by a watertight bulkhead. The forward engine room contains the auxiliary diesel generating sets, the general purpose pumps and much of the general machinery, all of which are electrically operated. In the after engine room are installed the two propulsion diesels with their controls, electric couplings, reduction gears and service auxiliaries and superchargers.

The original designs for V4 class tugs called for separate electric-drive blowers for supercharging each engine. In the first orders, totaling 49 tugs, all the power plants were arranged in this manner. Enterprise Engine and Foundry Company supplied the engines for 22 of these vessels. The technical staff of Enterprise were confident that their engine would produce better performance under the exhaust turbo-charged system with which they had long and profitable experience. On a repeat order for the propulsion power plants of 11 more tugs, the Maritime Commission accepted Enterprise's recommendations to install their exhaust powered supercharging system, and the result has been very satisfactory.

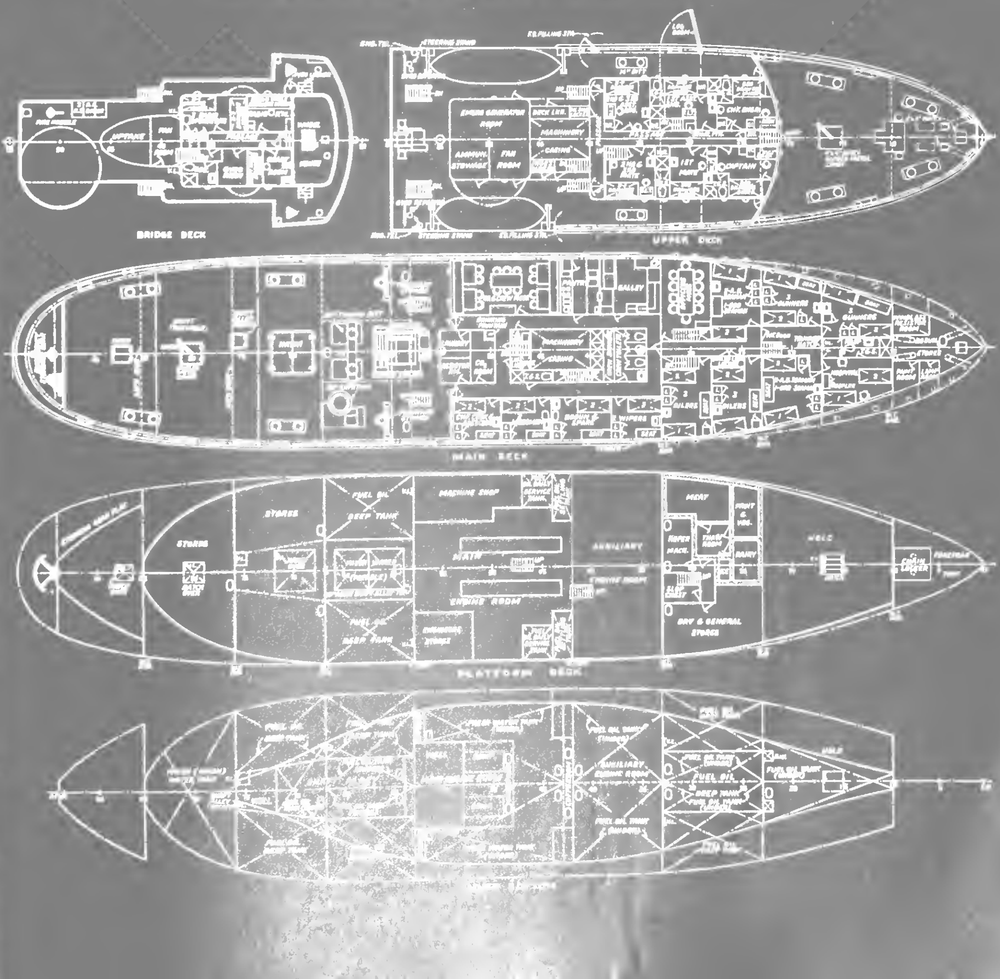
Each tug is equipped with two Enterprise D.M.Q.-36 type, six-cylinder diesels. Each engine is built with an Elliot-Buchi exhaust gas turbo-charger and is rated 1170 hp at 350 rpm. From the picture it will be noted that the turbo-blower assembly of the supercharger is carried on a bracket at the after end of the engine and is fed with exhaust gas directly from the exhaust manifold.

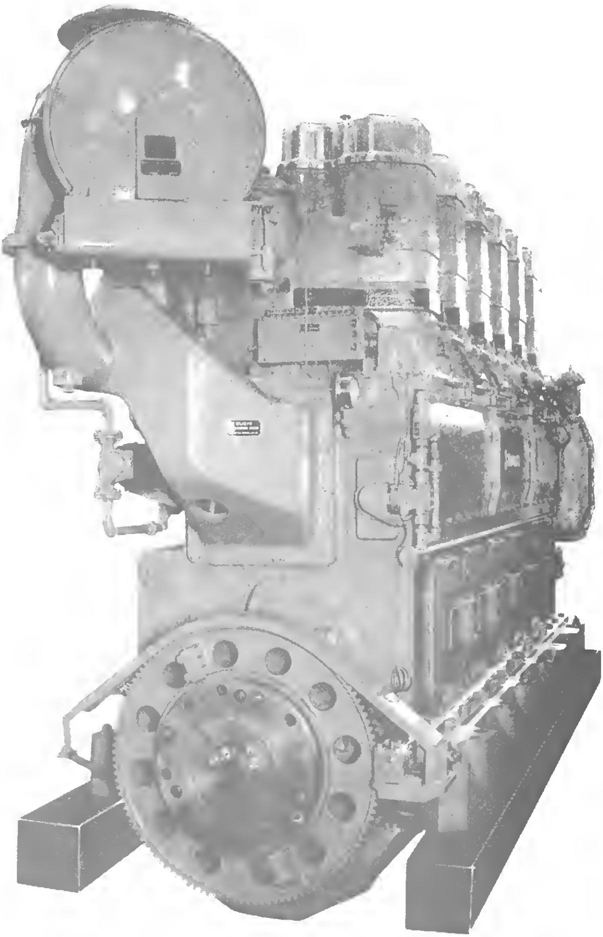
Exhaust turbo-blower supercharging has a great advantage in producing good torque conditions on the lower speed ranges, of value in towing operations. It also affords a more uniform fuel economy over a wide speed range.

The engines installed in these tugs are standard commercial Enterprise engines with a few refinements. The en bloc cylinder construction with cylinder liners that has characterized these engines is used, supported by a housing cast in a single unit and bolted to the bed plates. Through steel rods running from bed plate to housing top take the tensile stresses. Push rods are enclosed, and a neat alumi-



Inboard profile and deck plans give a good idea of the long-range character of these boats.





Rear view of D.M.Q.-36 V4 engine, showing turbocharger and gear.

num cover conceals the valves and rocker arms.

As shown in the illustrations, the housing is provided with access openings on each side at each crank. Connecting rod and crankshaft bearings are of the bronze backed precision shell type, manufactured by both American Bearing and Federal Mogul companies. Manzel force feed lubricators provide oil for cylinder lubrication.

Greatest difference from standard Enterprise practice is in the design and construction of the piston. Maritime Commission specifications demanded oil cooling of the piston and the technical staff of Enterprise decided the engine would work better at the rather high speed with a lighter piston. So in cooperation with the Aluminum Company of America, Enterprise developed an aluminum alloy piston design which provides cooling without the use of telescopic pipes or the presence of a large body of oil in the piston to increase its inertia.

This design calls for an aluminum alloy piston cast with a steel coil enclosure immediately back of the ring grooves. Oil goes to this coil via connecting rod, wrist pin and wrist pin boss. After circulating in the coil, the oil discharges into a cup located on the engine frame near the bottom of the piston travel. American Hammered Piston Ring Co. supplied the rings.

Bendix - Scintilla fuel injection equipment is used with a separate fuel pump for each cylinder mounted on top of the engine housing adjacent to the cylinder it serves. These fuel pumps and nozzle holders are made of highest quality materials and machined accurately to exacting tolerances.

In connection with the fuel injection system, two types of governors are used on these Enterprise engines. Pierce fly-ball type governors were selected to protect the reciprocating parts of the engine against destructive overspeed. These are set to bypass the fuel pumps on a certain overspeed that is well within the limits of safety.

For maintaining specified speeds and proper load division between the two engines geared to one shaft, Woodward type SI governors are used. The standard features of these governors are augmented by load limiting devices keeping engine power output to specified maximums under certain conditions. Woodward governors are noted for rugged simplicity and for precision in speed control.

Thompson valves are used for intake and exhaust control on these Enterprise engines. This famous valve is a Pacific Coast development, and is made in a Southern California plant. They combine a heat-resistant head with a hard, long-wearing stem. The head and the portion of the stem exposed to hot gases is of Thompson Ferchrome stainless, which is free from oxidation scaling and corrosion up to a temperature of 2000° F., and has a tensile strength of 70,000 psi at 1200° F. The stem is chrome nickel steel hardened to 330 Brinell. At the end of the stem is a deflector knob which, as the valve opens, deflects the hot gases out through the exhaust port and prevents overheating of the stem. This knob also prevents blow-by down the valve stem guides.

The construction of these engines has drawn on the resources of many states. All cylinder head gaskets were

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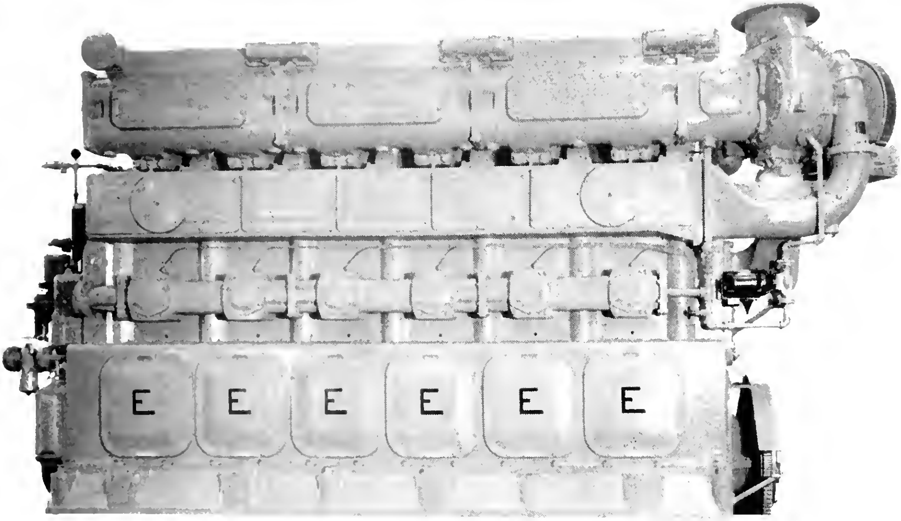
Above: Enterprise D.M.Q.-36 diesel engine with Elliot Buchi exhaust supercharger, exhaust side.

Below: Operating side of V4 D.M.Q.-36 engine, showing injection system and air reversing mechanism.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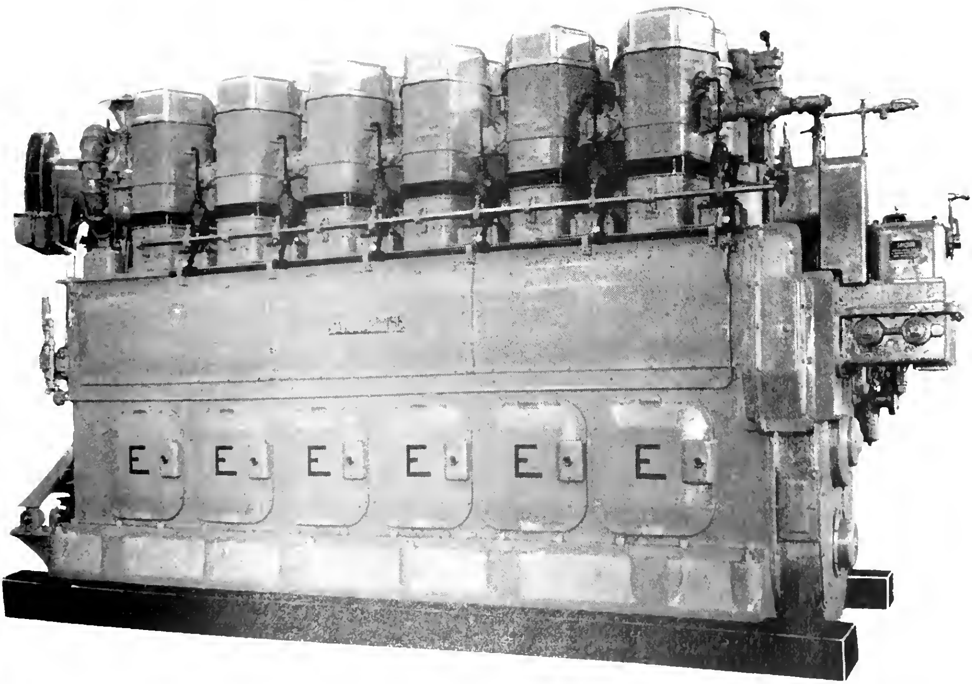
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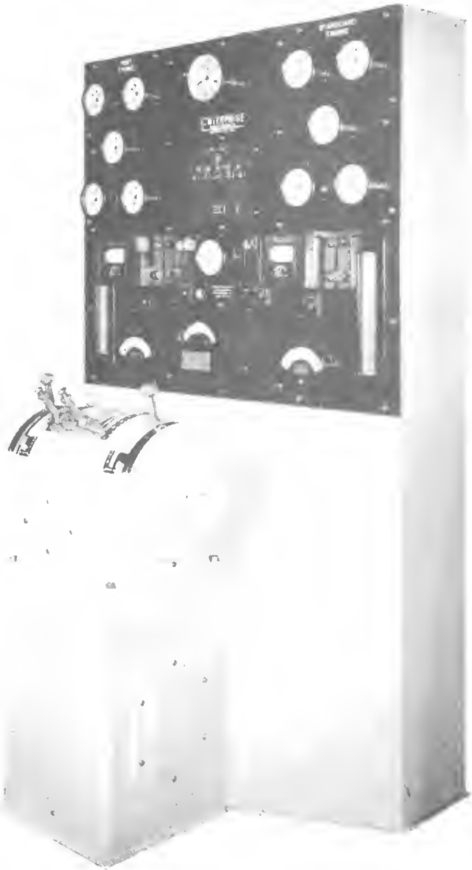


Control panel for propulsion engines, V4 tug.

supplied by the Johns Manville Co., San Francisco. The reversing mechanism is of the pneumatic type, the air motor of which was supplied by Chicago Pneumatic Tool Co. Connecting rods are by the Unit Drop Forge Co. of Detroit. The superchargers are from the Elliott Company in Pennsylvania. The crankshaft gear sets were built by Pacific Gear Co. of San Francisco. Cumberland Ground Shafting Co. supplied the camshafts, and the gear trains came from Pacific Gear and Tool Co. of San Francisco. The fuel filter is a Purolator from New Jersey. Reducing valves for air leads were produced by Miller and Stern, San Francisco, and the silencers were built by Maxim Silencer Company in Connecticut. Well over a dozen states are represented.

The separate foundries of Enterprise in South San Francisco and Richmond pour all the cast iron and bronze castings for the Enterprise diesel engine, such as cylinder liners, cylinder heads, manifold sections (exhaust and intake), water pump housings, blocks, bases and the like.

Each engine is connected to the driving end of a Westinghouse electric coupling, the driven end of which is directly coupled to one of the pinions of a Universal Gear Co. reduction unit having two pinions driving a gear wheel which is directly coupled to the propeller shafting. Electric couplings drive by magnetic pull through a positive air gap, and are ideal cushioners of shock from propeller or gears.

Control of both engines is centered at a control stand at the after end of the main engine room. This stand contains all necessary starting and speed control levers, and is backed by an instrument panel whereon the operating engineer may tell at a glance just what is going on in his engines. Here are mounted two Alnor Type A. J. 3880 pyrometers that can be plugged to give temperature readings from any of the 12 exhaust ports. Mounted also on this board are pressure gages for every essential service such as: starting air; lubricating oil for engine, for supercharger and for reduction gears; sea water for cooling; and air for supercharging. Located here too are the receiver-transmitter arrangements for engine room telegraphs and the signal lights for all the protective circuits.

At the port side of the main engine room is a well-equipped machine shop adequate to take care of ordinary maintenance work on the machinery, and on the starboard side of this space is a neatly arranged room for engineer's stores.

V4 tugs are being named apparently for various coastal headlands, channels and islands. Thus we have such names as Montauk Point, Wood Island, Trinidad Head, Bayou St. John, Southwest Pass, etc. Of the eleven tugs fitted with Enterprise, Elliot-Buchi exhaust supercharged engines, two were built at the Pennsylvania Shipyards, Beaumont, Texas; five at the Globe Shipbuilding Company, Superior, Wis.; and four at Pendleton Shipyard Co., New Orleans.

Data from certain comparative tests on two of these tugs show interesting differences in the performance of the same engines under different methods of supercharging. One of these tugs was equipped with D.M.O.-36 Enterprise diesel engines supercharged by separate electric drive positive displacement blowers. The other tug was equipped with the same engines fitted with Elliot-Buchi exhaust gas supercharging.

With the separate positive displacement blower for supercharging, the design was so established that the pressure is maintained constant by pressure-regulating valves. Thus, regardless of speed and load over the operating range of the engines from 60 per cent full speed to full speed, the supercharging pressure remains constant. With the exhaust gas turbine type of supercharger, the supercharging pressure is a function of combined load and speed over the whole range of those two factors. In

the comparative tests the engines were run up to rated speed, but the conditions were such that it was not possible to obtain full power, inasmuch as all trial runs are conducted with the tug "running free."

Specific fuel consumption was shown to be slightly higher for the exhaust turbo-supercharged job. However, this is far more than offset by the 160-kw electric load required to operate the supercharger. On the separately supercharged tug it was necessary to operate both 200-kw generating sets to take care of the supercharging and the normal sea service load, whereas on the exhaust gas supercharging job one 150-kw set provided ample current for all purposes.

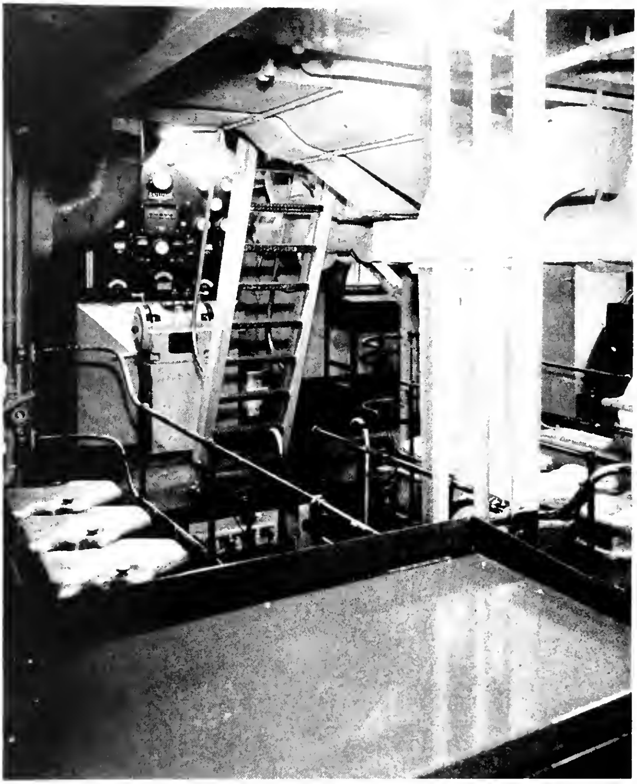
It is interesting to note in this connection that the specific fuel economy is practically constant over a wide range with exhaust gas supercharging, whereas with separately supercharged engines the specific fuel economy curve falls off quite rapidly above and below the rated power.

Many tests show decidedly that frequent and sudden heavy demands under maneuvering conditions are quite adequately and effectively absorbed by the exhaust gas supercharged engines.

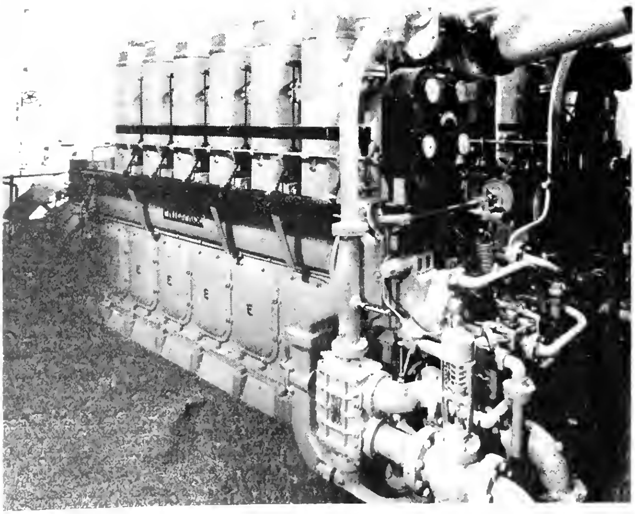
The D M Q -36 as installed in these tugs is guaranteed to produce 1170 hp at 350 rpm. With the Elliot Buchi supercharger, such engines in shop tests have operated on a continuous rating basis producing 1500 hp at 360 rpm. Any practical tug operator knows what that 30 per cent extra power might mean in a pinch.

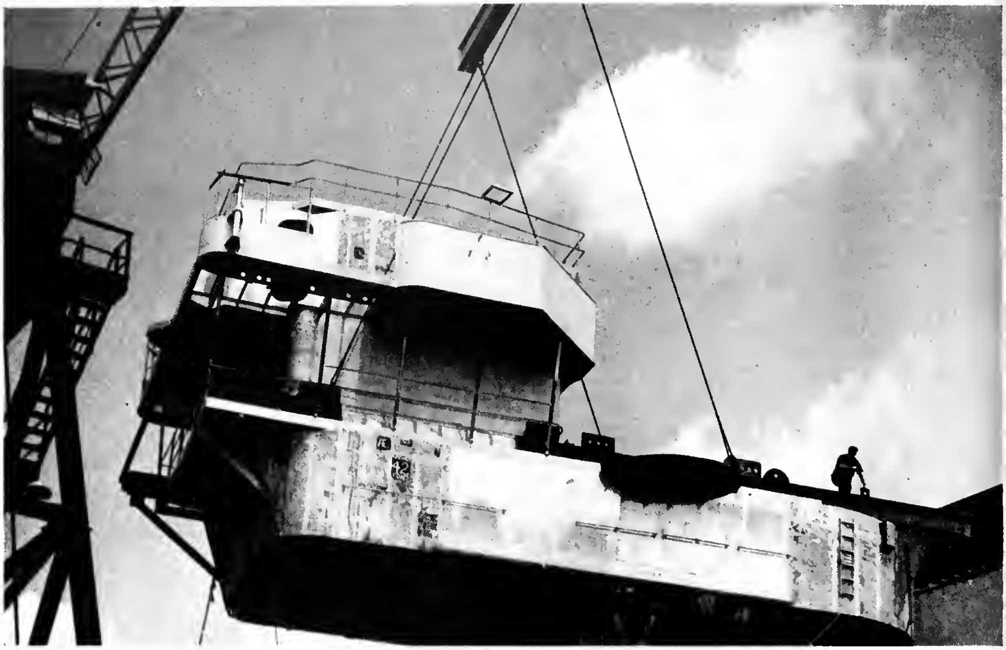
The question is often asked, Will supercharged engines run continuously? The first pair of Enterprise 1000-hp engines fitted with Buchi exhaust gas superchargers were installed on a boat on the Upper Columbia River in 1939. For approximately five years they have been operating satisfactorily under the most adverse conditions. During 1941-42 they averaged 19.6 hours per day.

The U. S. Maritime Commission supercharged diesel power plant for tugs is one of the most constructive and forward-looking designs that has come from the war effort. It produces a general purpose seagoing tug capable of handling any sea tow with efficiency and economy.



Above: Engine room on V4 tug, showing panel.
Below: Enterprise auxiliary generating sets as supplied to V4 tugs.





American Shipbuilding

BY U. S. MARITIME COMMISSION AND WAR SHIPPING ADMINISTRATION

THERE was no complacent attitude in the minds of American merchant shipyard labor and management as they ended their second year of record-breaking ship construction with the greatest month's production on record.

Again they have exceeded their goals. Here is the record for the 24th month of war construction, December, 1943. It is an all-time high:

Liberty ships	118
C-1's	6
C-2's	10
C-3's	4
C-4's	2
Tankers	22
Liberty tankers	13
Coastal tankers	2
Coastal cargo, concrete	1
Concrete barges	4
Frigates	15
Aircraft Carriers	5
P-2's	1
Seagoing Tugs	5
Total Vessels	208
Total D.W.T.	2,044,239
Total Vessels in 1943	1,896
Total D.W.T. in 1943	19,238,626

Full credit must be given to the workers and management in the merchant shipyards for their part in exceeding the President's January, 1942, directive for 1942 and 1943 of 24,000,000 deadweight tons by more than 3,325,000 tons.

The maximum employment was reached in the early fall of 1943 when slightly more than 700,000 workers in some 70 yards were welding together the Victory Fleet. Their December production was at the rate of nearly seven ships per day. The average for the year was between five and six ships per day. Shipyard workers are literally building a "Bridge of Ships."

Two years ago President Roosevelt, in his message to Congress on the state of the Union, directed that the Maritime Commission build 8,000,000 tons of merchant shipping in 1942. It is history to relate that the goal was exceeded.

During 1942 directives were issued establishing a goal of 16,000,000 deadweight tons for 1943. On January 5 of last year we promised that that goal would be passed. It has been. But Victory is not yet won.

In the calendar year of 1942 the Maritime Commission delivered into the service of the United Nations 746 ships, totaling 8,090,000 deadweight tons.

Of the 1896 ships delivered during 1943, Libertys accounted for 1238 vessels. Others were as follows:

C-1's	70
C-2's	53
C-3's	39
C-4's	5
Tankers	167
Coastal Tankers	28
Liberty Tankers	57
Passenger-cargoes	3
Coastal cargoes (2 concrete)	33
Ore carriers	16
Concrete barges	27
Seagoing tugs	46
Military Types (not transports)	114
Total	1896

In addition to these were 53 special types and a considerable number of smaller types, such as tugs, barges, etc.

In 1942, 59 C-type ships were built. In 1943 this number was increased to 167. These faster cargo ships are serving valiantly and efficiently. They are proving the real worth of the basic Maritime Commission ship designs. Their work horse sister ship, the Liberty, is carrying the great mass of fighting freight needed to defeat the Axis.

During 1942 the Commission delivered 62 ocean-going tankers; in 1943 we delivered 252 ocean-going tankers of all types. These are the ships that carry high octane gasoline to power the great armadas of aircraft which must cover the skies of the enemy, raining destruction on their production lines — fuel, for fighting ships and tanks, and for the

in 1943

armies that move on wheels and in the air.

During the year just ended, Commission yards delivered for the armed services some 114 vessels, not including transports. Outstanding among these were 19 aircraft carriers, which were built to a special Maritime Commission design. Still others were converted from fast merchant hulls. More than 20 high speed vessels were converted for use as troop transports. As the invasions of North Africa, Sicily, Italy, and the islands of the Pacific appeared imminent, a number of merchant shipyards, at the request of the combined Chiefs of Staff, were turned to the construction of specially-designed large landing ships. These ships, 75 delivered in 1942-43, landed fighting forces of the United Nations on beaches at the fighting fronts. Without them it might have been impossible to have carried on operations of a magnitude that assured quick victory.

During the year shipyards under Maritime Commission contracts have built and delivered to the United States Navy and to the British Navy 29 frigates. These frigates, together with aircraft, are lending valuable service in protecting convoys to the fighting fronts. Thus the Maritime Commission not only built the merchant ships to deliver the cargoes, but built ships to protect those merchant convoys in submarine-infested waters and under clouds of enemy bombers.

There has been some talk of unexpended money in Government agencies. The Maritime Commission has contracted for ships in numbers to use all appropriated funds. The delivery of these ships will run through 1944, with a few in 1945. As in the past, the Maritime Commission will be guided by war demands, by the directives of the Joint Chiefs of Staff and the Commander-in-Chief as war demands require.

Maritime Commission yards have productive capacity sufficient to use, in 1944, the same quantity of steel plates and shapes which they used in 1943. The emphasis is changing to ship speed and efficiency rather than construction speed, and tonnage will probably be less than in 1943. We cannot positively predict what numbers or types of vessels will be built in 1944.

The keels for the first Victory ships have been laid, and the first, the S. S. United Victory, was launched on January 12, and the plan is to build some 300 of them during 1944. We will continue the delivery of standard C-designs, tankers, special craft and Libertys as necessities demand. The program will be kept flexible enough to meet any special demands or requirements of our fighting forces.

A recent bill, passed by both House and Senate and signed by the President, appropriating $5,000,000,000 to be spent in the construction of special craft for the Navy, outlined what a part of our construction program will be during 1944.

Sir Archibald Hurd, an outstanding world shipping authority, recently said in the "British Shipping World":

"Ships—The Answer to World Famine

" * * * It will be a matter of ships, ships, ships, operated by the most experienced managers in accordance with a closely coordinated scheme of sailings. * * * Those well-manned ships saved the 47,000,000 men, women and children of this island

Three ships under construction at the Pascagoula yard of Ingalls Shipbuilding Co.

A full-blooded Iroquois princess trains as a welder at Todd Shipyards Corporation.

VESSELS AND DEADWEIGHT TONNAGE DELIVERED
IN DECEMBER, 1943 - BY REGIONS

West Coast:	62	EC2 Cargo
	6	Standard C-Type Cargo
	8	Standard Tankers
	4	Emergency Tankers
	1	Concrete Barge
	4	Frigates
	5	Transports
	5	Aircraft Carriers
	95	Vessels - 950,187 Deadweight Tons
East Coast:	40	EC2 Cargo
	6	Standard C-Type Cargo
	11	Standard Tankers
	1	Coastal Tanker
	3	Frigates
	1	Transport
	2	Sea-Going Tugs
	64	Vessels - 689,779 Deadweight Tons
Gulf Coast:	16	EC2 Cargo
	5	Standard C-Type Cargo
	1	Concrete Cargo
	3	Standard Tankers
	9	Emergency Tankers
	1	Coastal Tanker
	3	Concrete Barges
	3	Sea-Going Tugs
	41	Vessels - 396,273 Deadweight Tons
Great Lakes:	8	Frigates - 8,000 Deadweight Tons
GRAND TOTAL:	118	EC2 Cargo
	17	Standard C-Type Cargo
	1	Concrete Cargo
	22	Standard Tankers
	13	Emergency Tankers
	2	Coastal Tankers
	5	Sea-Going Tugs
	4	Concrete Barges
	15	Frigates
	6	Transports
	5	Aircraft Carriers
	208	Vessels - 2,044,239 Deadweight Tons

VESSELS DELIVERED IN DECEMBER, 1943

SHIPYARD	No. of Vessels	Type of Vessel
Alabama D. D. & S. B. Co., Mobile, Ala.	3	Tankers
American Shipbuilding Co., Cleveland, Ohio	1	Frigate
Bethlehem-Fairfield, Fairfield, Baltimore, Md.	21	Libertys
Bethlehem-Sparrows Point, Sparrows Point, Md.	2	Tankers
California S. B. Corp., Wilmington, Calif.	19	Libertys
	4	Emergency Tankers
Concrete Ship Constructors, National City, Calif.	1	Concrete Barge
Consolidated Steel Corp., Wilmington, Calif.	3	Transports
	3	Frigates
Delta S. B. Company, Inc., New Orleans, La.	9	Emergency Tankers
Federal S. B. & D. D. Co., Kearney, N. J.	1	Transport
	1	C-2 Cargo
Froemming Brothers, Milwaukee, Wis.	2	Frigates
General S. & E. Works, East Boston, Mass.	2	Seagoing Tugs
Houston S. B. Corp., Houston, Tex.	7	Libertys
Ingalls S. B. Corp., Pascagoula, Miss.	3	C-3 Cargo
J. A. Jones Const. Co., Inc., Brunswick, Ga.	4	Libertys
J. A. Jones Const. Co., Inc., Panama City, Fla.	4	Tank Carriers
Kaiser Cargo, Inc., Richmond, Calif.	1	Frigate
Kaiser Company, Inc., Richmond, Calif.	2	Transports
Kaiser Company, Inc., Swan Island, Portland, Ore.	7	Tankers
Kaiser Company, Inc., Vancouver, Wash.	5	Aircraft Carriers
Lancaster Iron Works, Inc., Perryville, Md.	1	Coastal Tanker
Leathem D. Smith S. B. Co., Sturgeon Bay, Wis.	2	Frigates
Marinship Corp., Sausalito, Calif.	1	Tanker
McCloskey & Co., Tampa, Fla.	1	Concrete Cargo
Moore Dry Dock Co., Oakland, Calif.	5	C-2 Cargo
North Carolina S. B. Co., Wilmington, N. C.	4	C-2 Cargo
New England S. B. Corp., South Portland Maine	10	Libertys
Oregon S. B. Corp., Portland, Ore.	16	Libertys
Pendleton Shipyards Co., Inc., New Orleans, La.	1	Seagoing Tug
Pennsylvania Shipyards, Inc., Beaumont, Tex.	2	C-1 Cargo
	2	Seagoing Tugs
Permanente Metals Corp., Richmond, Calif.	27	Libertys
Pusey & Jones Corp., Wilmington, Del.	1	C-1 Cargo
San Jacinto S. B., Houston, Tex.	3	Concrete Barges
St. Johns River S. B. Co., Jacksonville, Fla.	5	Libertys
Southeastern S. B. Corp., Savannah, Ga.	5	Libertys
Sun S. B. & D. D. Co., Chester, Pa.	9	Tankers
Todd-Galveston D. D., Inc., Galveston, Tex.	1	Coastal Tanker
Walsh-Kaiser Co., Inc., Providence, R. I.	3	Frigates
Walter Butler S. B., Inc., Superior, Wis.	3	Frigates
Western Pipe & Steel Co., San Francisco, Calif.	1	C-3 Cargo
	208	

[England] from starvation. And now the lives of no small proportion of all the peoples of the world are in peril. Only ships can rescue them. The great shipbuilding programs of this country, the U. S. A. and Canada—where the industry has been developed beyond the most optimistic dreams—were planned to win the war. They will prove the means of winning and consolidating the peace, for the solution of the world's urgent food problems will depend on sea transport conducted with the highest degree of efficiency."

The merchant shipyard workers of America stand ready to meet the demands that may come to them during 1944. They know the war is yet to be won. The ships constructed in 1943 have been delivered to the War Shipping Administration for use in delivering cargoes to all battle fronts. Just as the Maritime Commission met its "impossible" goals in construction, the WSA has met still more difficult goals in delivering cargoes.

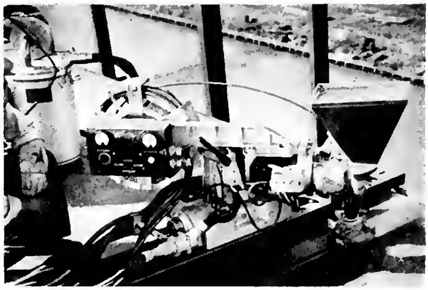
Under the control of WSA in late 1943 were about 2900 ships, operated by some 100 agents. Joined with these were the ships of the United Nations—all serving in a common pool for a common purpose—ultimate Victory.

During 1943 ships under WSA made untold sailings, "full and down" with millions of tons of needed war supplies—the output of American industrial plants. With these ships and their cargoes of fighting materiel, the American flag was seen in every port of the Allied world. It was carried to ports where it had never been seen before.

Port facilities were established where none existed, and the facilities of existing ports, where needed, were greatly expanded to handle a constantly increasing stream of war materiel.

Of the more than 12 billion dollars spent under Lend-Lease to supply our Allies with food and fighting equipment which they sorely needed, the larger portion moved on ships under WSA control.

Urgent pleas addressed to ex-seamen through the Recruitment and Manning Organization brought back to the sea more than 20,000 men, who with the more than 52,400 men trained under the war-expanded programs of the United States Merchant Marine Cadet Corps, the Maritime Service Schools, and the State Maritime Academies, manned the Victory Fleet. Some 28,000 are now completing training in these schools and aboard ship, preparing to man the ships as they are delivered.



Unionmelt welding machine making one-pass butt weld on 1⅜" plates; 1250 amps at 40 volts.

We have reached our production level and our shipping goals; but that doesn't mean any let-up in zeal or initiative; it doesn't mean any let-down in quality or quantity. It does mean hard work, efficient work, an honest day's work—every day in the year 1944—to maintain those records.

The United States Maritime Commission and War Shipping Administration cannot too strongly impress upon every man, woman and child in the United States the necessity of giving their best efforts — mental, moral and physical—throughout the entire year of 1944.

During 1944, with the experience of 1942 and 1943 behind them, the Maritime Commission and the War Shipping Administration will continue to deliver the ships and deliver the goods until we gain the ultimate Victory.

VESSELS AND DEADWEIGHT TONNAGE

DELIVERED PER MONTH - 1943

	Number of Vessels		Deadweight Tonnage	
	Per Month	Cumulative	Per Month	Cumulative
January	103	103	1,007,680	1,007,680
February	130	233	1,236,481	2,244,161
March	146	379	1,513,244	3,757,405
April	157	536	1,603,307	5,360,712
May	176	712	1,782,836	7,143,548
June	167	879	1,670,442	8,813,990
July	158	1037	1,669,341	10,483,331
August	164	1201	1,690,411	12,173,742
September	160	1361	1,652,571	13,826,313
October	163	1524	1,675,311	15,501,624
November	164	1688	1,692,763	17,194,387
December	208	1896	2,044,239	19,238,626

	SHIPS	DEADWEIGHT TONNAGE
1942 Total	746	8,089,732
1943 Total	1896	19,238,626
2 Year Total	2642	27,328,358
December 8 - December 31, 1941	9	92,175
Total Since December 7, 1941	2651	27,420,533

The Child Service Center at the Swan Island Yard. The one at Oregon Shipbuilding Corp. is a duplicate.

CHILD SERVICE AT BUSY SHIPYARDS

"DADDY was busy shooting Nips and mama was at Kaiser's building ships" might well have grown to be the stock excuse for a wave of juvenile delinquency following the war, had it not been for the foresight of shipbuilders at Kaiser's Swan Island and Oregonship plants.

Although taking care of children is a far cry from the building of cargo vessels, it became a serious problem when women were recruited for shipyard labor, and this problem fell right into the laps of shipbuilding executives. It didn't take a crystal ball to tell them that if they wanted women to build ships they had to find means of taking care of the offspring of their thousands of prospective women employees.

The construction of highly specialized Child Service Centers at Oregonship and Swan Island has licked this problem. Mothers working in those yards may now feel free to do an all-out job of shipbuilding without having to worry about whether little Johnny is getting his afternoon nap. They don't have to give the welfare of their children a thought during the entire working day, because these children are in excellent hands and are receiving the

Tricycles, slides and play equipment are provided. Children play in the enclosed porches when weather is bad.

best attention the facilities of the organization can possibly supply.

What has this to do with the building of ships? A great deal more than can be seen on the surface. For one thing, it is a very measurable aid to the morale of working mothers to have the worry of obtaining proper care for their children taken off their shoulders, and with the number of women now working in shipyards, this item will be reflected in the reports of ship tonnage completed this year.

The two Child Service Centers opened in November of last year, and are said to be the most modern and scientifically operated child care centers in the world today.

Built with the sole purpose of providing care for the children of working mothers, they are supervised by directors trained specifically for this type of work. Officials declare that there is absolutely nothing "makeshift" about the entire project.

An exacting daily schedule is followed. When a child enters the center in the morning he is given a careful inspection by a nurse so that the spread of colds and diseases will be kept at a minimum. A play program, consisting as much as possible of outdoor recreation, is followed. There are sand boxes, blocks, modeling clay, water colors, crayons, tricycles, climbing apparatus, wheel toys, swings, wheelbarrows and all the other items dear to the hearts of boys and girls from a year and a half to six years old.

After the morning play period there is a 15-minute rest period, followed by a mid-morning "juice time," when all the youngsters are served fruit juice. From then on until time for lunch there is a quieter type of play, such as clay modeling, stories, music and painting. At noon is the main meal of the day, including all items necessary to meet the growth requirements of children of various ages.

After lunch comes "sleep time." Supervisors say that all children sleep as soon as they are convinced that it is the thing to do, and maintain that this is even true of children who have long since given up the procedure of an afternoon nap at home. It is this total program of exercise, good food and rest that accounts for the gains in physical development of children in nursery school.

Following the nap there is another light afternoon lunch, and then a play period which lasts until the child is called for by its mother. Children are divided into groups according to age, and each group is under the supervision of teachers trained for work with that specific age. The program for the swing and graveyard shifts, of course, is designed to include more sleeping time, and is adjusted to meet the different times of day.

The centers care for the children of mothers on all three shifts at both the Swan Island and Oregonship yards, and are in operation seven days a week. The total cost, including food, for children from one family is as follows: one child, 75 cents per day; two children, $1.25 per day; three children, $1.75 per day.

At the story hour, children sing and listen to stories and music.

Children play outdoors as much as possible. Here some are playing with hollow plywood blocks, part of the playground equipment.

"No Work, No Woo"

FOR LATES, NO DATES

ALBINA CAMPAIGNS AGAINST ABSENTEEISM

Above: L. R. Hussa, vice president of Albina Engine and Machine Works.

Below: Al Lake, chief of public and employee relations.

One of the most unusual means of combating World War II's production bugaboo of "absenteeism" has been founded, and is being fostered by, executives of the Albina Engine and Machine Works at Portland, Oregon.

L. R. Hussa, vice president of the shipbuilding concern, points out that:

"In this war, we who are responsible for building our nation's fighting ships must solve a myriad of problems which are far from the usual ones of shipbuilding. We have learned that in this day of fat pay envelopes and long working hours men and women turning out ships are going to take 'French leave' from their jobs to spend their money, as well as attend to countless items of personal business which they can't find time to do by working regularly.

"We believe, however, that the founding of the 'No Work, No Woo' movement among the women workers at Albina has had much to do with reducing our number of absentees. It's certainly no secret that since the beginning of time men have been trying to do things to please women—and now that the women of Albina have vowed not to go out on a date with any man who is an absentee we are finding that the men are very reluctant to stay away from their jobs."

The "No Work, No Woo" club—if it can be termed as such—is the brain-child of Al Lake, Albina's enterprising Director of Public and Employee Relations, who has fathered other equally spectacular ideas as aids in reducing the personnel problems of shipbuilding men and women, and is pleased, but not very surprised, to learn that every one of them is paying dividends.

Vice President Hussa declared that:

"We readily admit that labor is not a commodity which may be bought or sold on the open market. Men and

Extreme left: Jeannine Christensen, president of the "No Work, No Woo" club, at work as a burner in the plate shop.

Left: Here is Miss Christensen relaxing prior to a date — with a lad who hasn't been on the absentee list!

women can't be relegated to the lot of machines, and the sooner American business comes to realize this fact the sooner labor problems will become a thing of the past.

"Our gang here is kept advised of everything the 'front office' is doing which has any bearing on their jobs —just the same as we expect to be kept advised how things look from the employee end. We are not treating the folks here as so many cogs in our machine. Every one of them is treated as an individual with individual problems; problems which we must help solve if we expect them to get a job done for us. Through this we have learned that labor is alive with possibilities, and that it will go the limit every time—with proper handling. We know we're right, because our production has resulted in our being awarded the Army-Navy 'E' with three stars, indicating continued achievement. The Navy has told us that there is no other yard on the Coast doing as complex a job as we are with the same amount of speed and quality of workmanship— and at such low cost. We're proud of that, and we're also proud that we are the only yard in our district which is operating without any form of Government financial aid.

"There's no magic to it. It's simply a case of treating human beings as men and women rather than as machines which you expect to turn out a given amount of work each eight-hour shift. This formula has worked to the point where we can show an absentee record which is below that of our pre-war normal. It's clear to us that any organization suffering from the ills of acute absenteeism can honestly blame nothing but poor management!"

Mr. Hussa maintained that much credit for these records is due to the guiding hand of Mr. Lake, who was one of the first to insist that no man could hire in at Albina as a supervisor. "Every boss," he said, "has got to work his way up through the ranks. Any helper here has the chance to become general superintendent—just the same as every American can hope to some day be President."

Mr. Lake has made an exhaustive study of the underlying motive behind every case of chronic absenteeism—cases where a man may be away from his job three or four days and come back broke and with a "hangover."

"In almost every case," he said, "we find that it all started with wanting to get a haircut — buy license plates—get shoes fixed—look for an alarm clock — hundreds of little things like that.

"As a solution, we've arranged with a local shop so that the man wearing an Albina badge is "next" when it's time to get a haircut—regardless of how long a waiting line there is. We have taken over a shoe repair shop, and now rather than wait three weeks, our boys get immediate service on shoe repairs. We bought up a bunch of discarded alarm clocks, had them reconditioned, and sold them in the yard at cost. When we heard complaints about the price of fresh fruits and vegetables, we opened a 'farmers' market' outside the gate, where fresh produce could be had at 40 per cent less than local markets. That helped kill the black market on produce in a hurry."

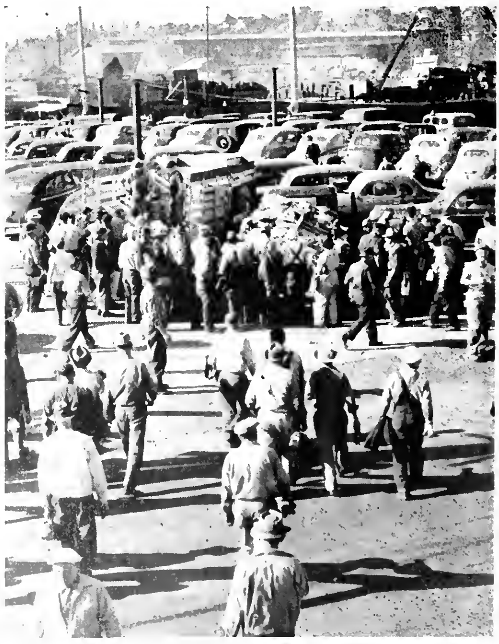
Other items now being handled for Albina workers right at the yard include insurance, chewing gum and candy bars (often unavailable on the open market), license tags, Easter flowers, Christmas trees, garden seeds and countless other things that a man or woman might leave the job for a day to get if not available in regular time off.

Morale is consequently high at Albina. Other aids to this are such things as their band, which performs regularly at lunch time and at employee dances, and the athletic teams, which have hung up a record of championships anyone might well envy. Regarding the athletic teams, Mr. Lake says, "They aren't any better than the others—they've just got the darndest spirit you've ever seen —and it's helping to build ships as well as to win pennants and trophies."

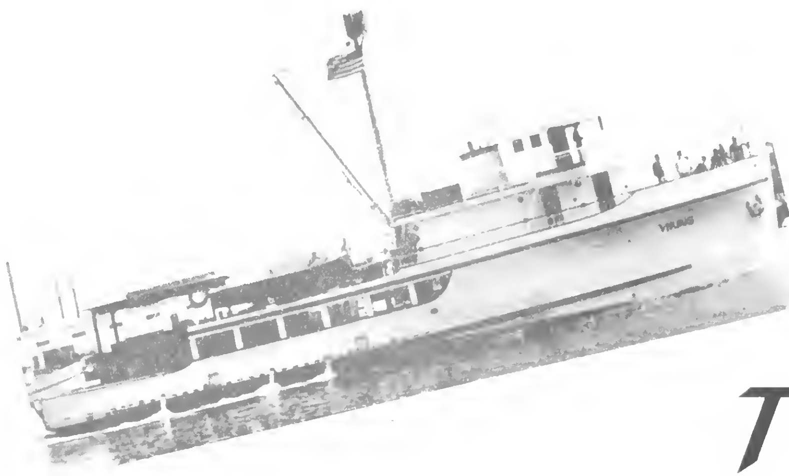
In conclusion, he pointed out that "No Work, No Woo" has now spread to 417 other war plants, and boasts a membership of more than 13,000, adding:

"Recently several national magazines have made much over the outstanding results in employee relations achieved by my department, but I want to say that without the vast shipbuilding experience of L. R. Hussa and his genius for getting the most out of employees while making them happy, I could have accomplished little more in this yard than to get into a comfortable rut.

"However, when Mr. Hussa and President George Rodgers give a fellow the 'go' sign, they let him go. It's easy to accomplish things when you work for men who know what they're doing."



The informal "Farmers' Market," operated outside the gates of the yard in protest against high produce prices in downtown Portland markets.



The tuna clipper Viking, built by Frank W. Hodgson in the yard of Hodgson - Greene - Haldeman Shipbuilders.

TUNA

FOR 18 MONTHS the Hodgson-Greene-Haldeman yard has been the scene of the biggest wooden shipbuilding activity for the war effort in the Long Beach area. Contracts covering 101 wooden vessels of many types, totaling over $6,000,000, have been built or are nearing completion in this progressive yard, whose modern facilities are a testimony to the patriotism, energy and resourcefulness of the three partners—Frank Hodgson, Burch Greene and Henry Haldeman.

These men have invested a half millions dollars in buildings, shops, ways, machinery and equipment, which has enabled them to do this outstanding job.

At the time of Pearl Harbor, Burch Greene and Henry Haldeman were engaged in the automobile business in Los Angeles, running the largest Chrysler-Plymouth dealership in the world. Frank Hodgson was building tuna clippers on a 50-foot waterfront site in Long Beach with less than a hundred employees. His boat-building ability was highly regarded by the Transportation Corps of the United States Army and, when Mr. Greene and Mr. Haldeman teamed up with him in a partnership, giving the business the needed capital and managerial ability, the contracts came rapidly. The following tabulation shows the vessels this firm has built or is in process of completing for the Government:

1	40-foot Tug	Transportation Corps
20	50-foot Motor Sailors	Transportation Corps
5	180-foot Cargo Barges	U. S. M. Commission
5	127-foot Twin-Screw Diesel Tugs	Transportation Corps
6	127-foot Single-Screw Diesel Tugs	Transportation Corps
5	204-foot Cargo Barges	Transportation Corps
59	46-foot Towboats	Transportation Corps
101		

A 127-foot U. S. Army tug on her trial run. She is a twin - screw vessel with 1200 - hp engine.

Partners in the firm. Left to right are: Frank W. Hodgson, Burch E. Greene and Henry F. Holdeman.

CLIPPERS Coming Back

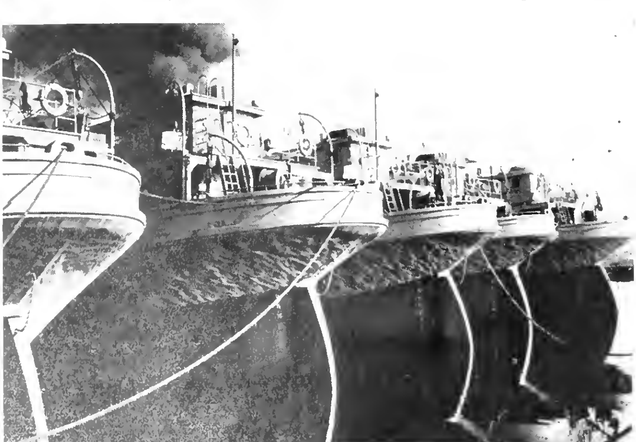
With the Government's wooden shipbuilding program nearing its completion, the splendid facilities of Hodgson - Greene - Haldeman Shipbuilders are being directed toward helping the Government ship-repair program and assisting in the rebuilding of the fishing fleet. Food is just as vital as ships in the war program. The Office of Coordinator of Fisheries in the Department of the Interior is eager to grant priorities for the building of fishing vessels to fishermen, canneries and shipyards who get together on agreements to build them. The Hodgson-Greene-Haldeman Shipbuilders have much to offer the fishing industry. Their yard comprises 22 acres on which are located 30 building ways, two outfitting docks, three launching ways (two side- and one end-launching) and the following shops: machine, electric, joiner, blacksmith, welding, rigging and paint shop. There is also a big mold loft, an oakum loft, lumber mill and ample warehouse facilities. In addition to good facilities it takes trained workmen, good management and capital to turn out a satisfactory fishing boat.

Here again the experience of building over a hundred ships for the Government has given this yard a group of highly skilled shipwrights and mechanics in all crafts that can produce Class A wooden vessels of any type.

Frank Hodgson has built some of the most successful fishing boats on this Coast. The record of the Viking tuna clipper is well known to the fishing industry—91 feet long, equipped with a 340-hp Superior engine and complete mechanical refrigeration. This vessel earned its total cost for its owners in only nine months of operation. A sister ship, the Sea Lion, did the same in the first year of service. Other vessels like the Monarch have also turned in a much better than average earning record.

Three tuna clippers are now under construction in this yard. Two are of the 90-foot class, each equipped with a 330-hp Superior diesel for propulsion and with two 85-hp Superior diesel generating sets. Each has a capacity for 165 tons of fish and is equipped with brine refrigeration. One is to be named Viking II, and was contracted for by Vincent Gonsalves to fish for the French Sardine Company. The other, to be christened Monarch II, is being built for Joseph Rodgers to fish for the Southern California Fish Corporation. The third is a 110-foot tuna clipper for Frank Gonsalves, Jr., to fish for the French Sardine Co. She will be driven by a 500-hp Enterprise Supercharged diesel and will have two 100-hp Caterpillar generating sets. Her capacity will be 200 tons refrigerated fish using the brine system.

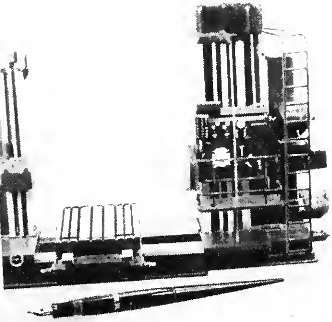
It is an interesting fact that the electric systems on all three of these boats will be alternating current.

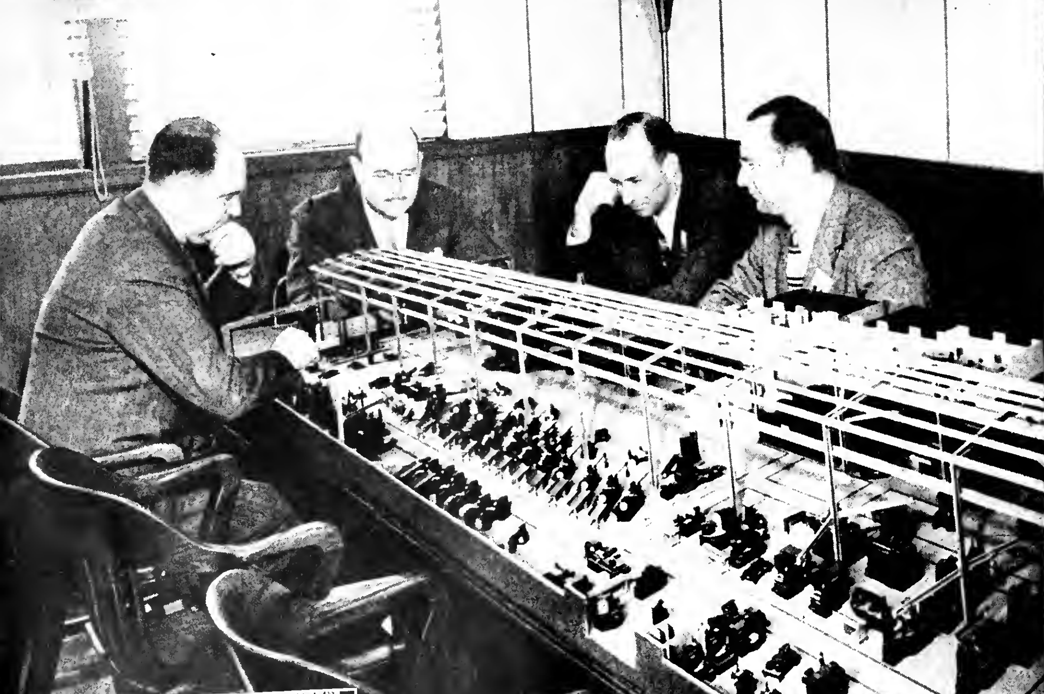


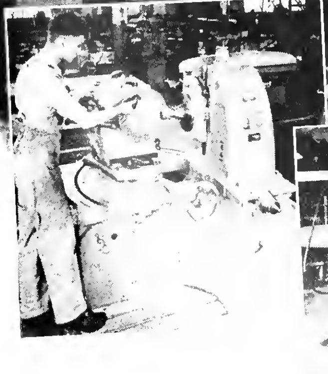
Stern view of five 180-foot cargo barges built for the Maritime Commission.

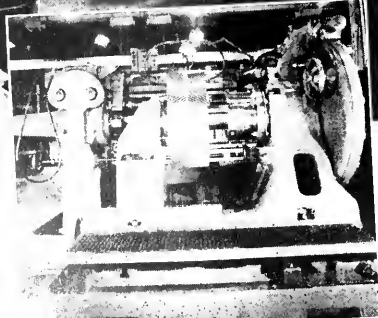
(Official U. S. Army Signal Corps Photo)

WESTERN GEAR









Upper left: Detail and size of Bill Zimmerman's miniature of the 90,000-pound Giddings & Lewis horizontal boring mill is shown compared with a desk pen.

Large picture shows a group studying the problems of production machine location and plant layout. They are: Berchman A. Bannan, vice president; Thomas J. Bannan, executive vice

WORKS SOLVES VITAL PROBLEM

Philip L. Bannan, president Pacific Gear & Tool Works of San Francisco, Western Gear Works of Seatle, Los Angeles and Lynwood, California.

president; Philip L. Bannan, Jr., Treasurer; and Charles F. Bannan, secretory.

Extreme left: Testing speedboat spiral bevel gears on the Gleason Hypoid Tester.

Left: Mine sweeper propulsion gears being generated on 62" Farrell Sykes gear generator.

Above: Hobbing 5" twin gun mount gear segment on 90" Gould & Eberhardt hobbing machine.

by Bob Sullivan

TO DESIGN the location, from an engineering and efficiency expert's viewpoint, of a 90,000-pound precision machine in a projected factory which was to be built on property where ground water is only four feet below the surface is no easy task. This, however, was only one of a multitude of problems facing the owners and executives of Western Gear Works, when in May, 1941, representatives of the United States Navy offered capital finances to construct another plant. As Western pioneers in the gear industry, the Bannans acknowledged their responsibility to the National Defense Program and thus it was that they now found another tremendous job before them. In consultation with the Navy officials, Lynwood, California, was selected as the most suitable site, so the design and choice of plant and equipment got under way.

The job of constructing a new factory building entails many hours of thought and toil, but aside from this there is still the problem of machinery arrangement in order to secure maximum production and highest performance of the machines individually and collectively as a manufacturing unit.

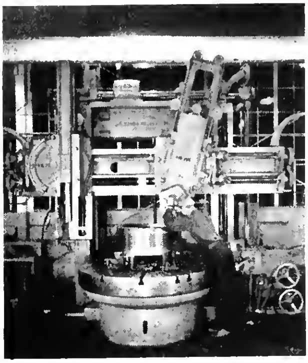
Under the leadership of Philip L. Bannan, who for over 50 years has successfully headed the Pacific Gear & Tool Works of San Francisco and the Western Gear Works plants in Seattle and Los Angeles, and with four of his sons, who share the executive responsibilities of the companies, fell this important assignment. This one was extremely difficult because Time was the most important element, and the finished work also had to meet the exacting requirements of the United States Navy, for whom the plant was to produce gears and gear units.

Philip L. Bannan entrusted the work of creating the new plant to the hands of his sons. Realizing the need for speed due to the gravity of the war situation, these men went to work with enthusiasm and increased effort to complete the project in record time.

Much could be said about the hurdles which had to be taken in getting the plant into actual operation, but one step in particular stands out as a topic of interest and a milestone of progress; the method used in planning, placement and arrangement of machines which were to perform the various operations needed to complete the manufactured parts and units.

That the Navy used charts and diagrams in order to mark positions and movements of ships at sea and also were using miniature ship models which were moved about on huge maps in order to work out strategies and maneuvers to be used in naval warfare, may have been the source of the idea which the Bannans utilized in their plant planning project.

(The author is staff technician, Western Gear Works, Lynwood, Calif.)



Above: Turning a large steel gear blank on the 72" King vertical boring mill.

The idea of using actual scale models for this planning, however, was a gradual development from the stage of using small scale size angular bits of cardboard placed upon a scaled floor plan of the factory, which in turn was spread out on the dining room rug at the home of one of the Bannans; and the cardboards were moved about in various positions. During the shifting about of these bits of paper, there was much discussion as to where and how various machines were to be placed and, as difficulties in any chosen placement arose, the cardboards were shifted to meet the particular problem in question. From this it was decided that wooden blocks in a scale size would give a third dimensional aspect to the planning that would in turn give a clearer picture of the set-up. Even this proved inadequate, however, as it was difficult to visualize the position of the operator or the location of the motors and switches of the machine. It was then decided that miniatures or scale models should be constructed so that a picture closely similar to the actual and final set-up of the plant machinery could be arranged. To find a man who could handle this job was no easy matter, but at last an artisan by the name of Bill Zimmerman was found who could do the work in the technical manner desired. Zimmerman's Cinema Pattern Works has completed many a similar tough job for the movies and aircraft plants. He has developed some of the most intricate of patterns, models of complete movie sets and of ships, including one of the Normandie in very faithful detail. Zimmerman created, built to scale of $\frac{1}{2}$ inch to the foot, each and every machine needed to put the factory on a production basis. The machine models were complete from the actual body down to the various controls. All the machines to be included were represented from the largest 90,000 - pound Giddings and Lewis horizontal boring mill, which took two flatcars to deliver, down to the smallest Rivett precision lathe. These several hundred miniatures, when completed, were carefully painted in order to give them as realistic an appearance as was possible. Then the assorted machines were placed on a large table, the top of which had been completed, were carefully painted in anticipated interior of the plant itself. This interior was complete with partitions and a skeleton framework of the walls and inside elevations, including supporting beams and posts.

Then the machines were placed in approximate positions on the model floor plan and the planning group carefully considered the characteristics of each machine, deciding on positions for each which would best serve the objective in view. The objective being to get maximum production and highest precision performance in relation to the machine itself and to the other machines which would operate in conjunction with it. Careful study was made of material

Upper left: Interior of Lynwood plant, looking over the Barber-Colman hobbing and Fellows Gear Shaper department.

Left: View from Lees-Bradner thread mill and Landis cylindrical grinder section of Western Gear plant.

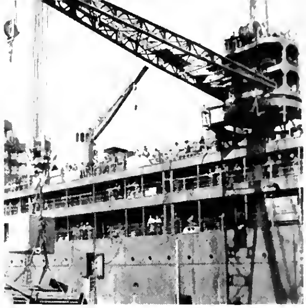
handling, that there would be a minimum of foot-pound haulage. Heavy machines using the heaviest materials were to be located nearest to incoming stock, and materials traveling the greatest distance should be of the lightest weight destined for the smaller machines. Essentially, the two extremes were woven into Production Flow.

As the final arrangements were developed, the positions were noted on the blueprints so that the proper foundation could be poured to give each machine adequate foundational support. Due to the condition of the land upon which the plant was to be built, it was found necessary in many cases to drive pilings deep into the earth. These pilings were in turn filled with concrete, and about their tops concrete was poured to a depth of from 3 to 4 feet, tying the pilings together and forming a solid base upon which to set the machine.

The use of the model did not cease with its machine placement application and foundations. It proved a great boon to the electrical engineers when it came to the laying of wire conduits, as loads and lighting could be accurately pre-established. Knowing the type of machine and number and placement of each, it was possible to predetermine the needed power and load required at any point of the factory. Overhead hoists and cranes were also hung in relation to the weights and lifts necessary in any spot which was designated by the model.

The Western Gear Works Lynwood Plant was designed and planned to be one of the most universal, complete all around gear manufacturing factories in the United States, and the Western Gear Works did not miss the mark. Since its completion, the plant has turned out thousands of precision gears and geared units. Every type of gear, from the smallest to the largest, has been or can be produced by Western Gear Works. During the war and until its end, the plant will be primarily concerned with producing gears for the Allied war machine. Upon cessation of hostilities between the nations, the plant will be dedicated to the full-time production of gears for American peace time industries. The paper industries, the shipping and oil industries, the aviation and many others will be supplied with gears and gear units.

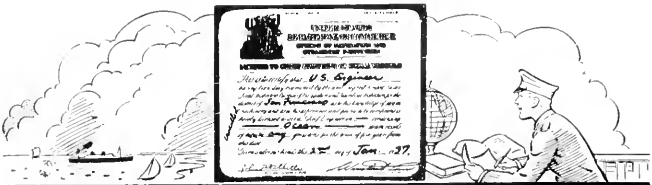
For the United States Navy, the plant produces propulsion units for mine sweepers. All of the machining and making of parts, including the finishing of casing, is accomplished at Western Gear Works. The final propulsion units are tested for the Navy under overload and excess speed before they leave the factory for installation. Other Navy work produced in the plant are such units as capstans and anchor windlasses for the L.S.T., and steering gear units for the L.C.I. Numerous other single gears are manufactured for Navy use.



Above: Western Gear boat and airplane crane undergoing tests during installation on a submarine tender at Moore Dry Dock in Oakland.

Upper right: Majestic in flight, the giant PBY's — the Navy's patrol bombers, known familiarly as Catalinas—are doing yeoman's work in this far-flung war. Western gears do their part.

Right: Large invasion craft (LST) equipped with Western Gear bow door and ramp gate mechanism and anchor windlass capstan.



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California

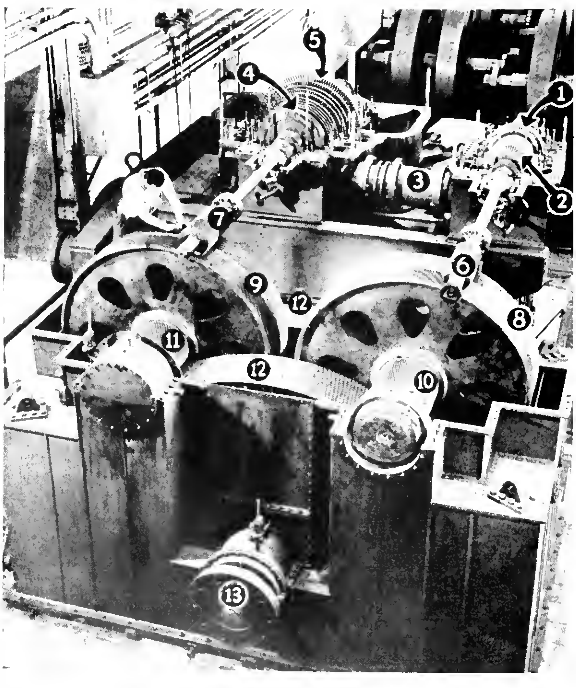
MODERN STEAM POWER

The Victory Geared Turbine Unit

Our illustration shows what drives a turbine engined steamer—the first 125-ton, 8500-hp geared turbine unit built to power America's new sub-dodging Victory cargo ships.

Such propulsion units are in mass production, at a rate soon to reach millions of horsepower a year, at the Westinghouse Merchant Marine Division, Philadelphia, Pa. The unit is shown here without the covers that normally enclose both turbines and gears.

Here's how such a turbine works: Water in a boiler is converted into superheated high-pressure steam—almost hot enough to turn steel a dull red. This steam enters the far end of the high-pressure turbine (1) at the right rear of the picture. In less than 1/30th of a second, it races the length of the turbine, impelled by its 440 pounds pressure and 740 degrees Fahrenheit temperature and its own urge to expand past more than 2000 stainless steel blades. Hurtling forward faster than sound, the steam shoves the angled blades aside, as a gale whirls a windmill, thus imparting a continuous 4250-horsepower spin to the rotor of the turbine.



By the time the steam reaches the rear, or exhaust, end of the turbine (2), the whirling blades have converted into rotary power some 410 pounds of its original 440 pounds pressure, and 480 degrees of its original heat. But from this remaining 30 pounds of pressure and 260 degrees of heat, a second, longer-bladed turbine (4), in which the steam can expand still further, extracts an additional 4250 horsepower. The partially "deflated" steam reaches this second, low-pressure turbine through a connecting pipe (3).

By the time the steam has completed its turbine-length charge through the low-pressure unit, giving up power as it goes, it hasn't enough heat left to cook an egg—and it is actually in almost a complete vacuum. At this point (5) it is sucked into a condenser, situated beneath the pair of turbines, where it is cooled back to water. This water is pumped through heaters back to the boiler to be reconverted into steam.

When operating at full power, the high-pressure turbine spins at 5300 revolutions a minute, while the low-pressure unit turns 4400 rpm. Both turbines transmit their spinning power to the ship's comparatively slow-turning propeller (less than 100 revolutions a minute) through a train of speed-reducing gears that do the same job as the transmission gears in an automobile.

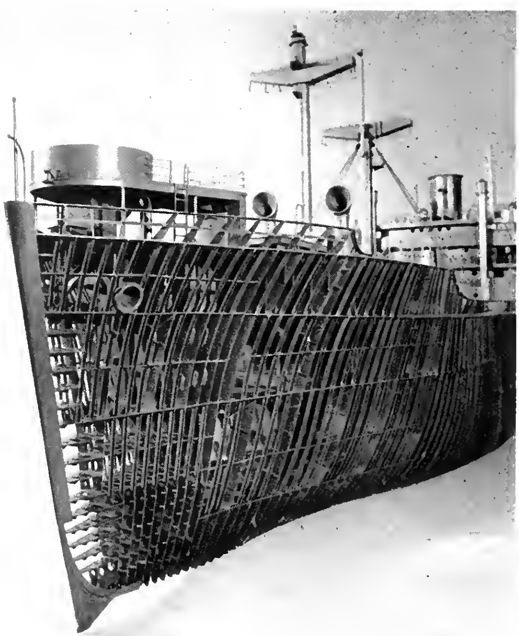
The small pinions (6) and (7) which are attached to the ends of the turbine rotor shafts revolve at the speeds of the turbines. Of different sizes to compensate for their 900 rpm difference in speed, they drive a pair of intermediate reduction gears (8) and (9), which in turn, through their intermediate reduction pinions (10) and (11) turn the huge "bull" gear (12). The ship's propeller is attached by a shaft directly to the center shaft of the "bull" gear, where it protrudes through the gear case at the lower front center of the picture (13).

The whole propulsion assembly—two turbines, condenser, gear case and gears—weighs more than 125

tons. Yet so small must operating clearances be to get utmost power from every pound of steam, and to reduce noise that might give the ship's position away to enemy listening devices, that virtually every step in the manufacturing process is measured in thousandths of an inch. Even a fine watch, "blown up" to turbine size, would appear coarse by comparison. The 12-foot "bull" gear to which the propeller shaft is attached, for example, is machined continuously for more than three weeks in an air-conditioned room — because changes in temperature or a new start after the "cut" gets under way might impair the accuracy of the finished gear.

Scale Model of Victory Steamer

By Polly Hall



Port view of the bow of the AP-3, whose hull design is also to be used by Calship for 34 troop transports. Additional bulkheads will be added for the troopship, and all of the cargo space aft of Hold One and forward of Hold Five will be changed to troops' berths, galleys, shower rooms, crew's quarters and officers' quarters.

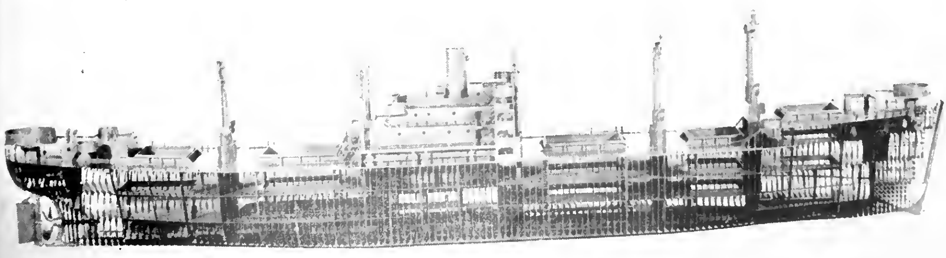
Faced with the vast industrial problem of shifting from the mass production of EC-2 Liberty ships to the more complex AP-3 Victory ship, California Shipbuilding Corporation began the solution by ordering a 9½-foot model ship to instruct the men who were to build the real thing.

Built under the supervision of Cyril Hubert, chief loftsman, by George W. Morrow, model construction foreman, and a group of assistants, the model is intentionally without shell plates so that the frames, bulkheads and platform decks are visible. Because the most immediate need was to show supervisors, foremen and workers on the ways and in the shops the plan of the new ship, the later-occurring problems of piping and rigging were not tackled in this model.

The ship is scaled one-quarter inch to the foot, and is 9 feet 5⅞ inches long and 15½ inches beam. The Victory itself measures 455 feet in length, with a beam of 62 feet. The Liberty ships, the last of which are now under construction, are 13½ feet shorter and 5 feet narrower. Other hull differences in the two vessels include finer lines in the Victory ship, lack of a bilge keel, and a perfectly flat bottom from bilge to bilge. The stern frame is formed into a contrapropeller above and below the shaft boss. This is calculated to improve propulsive efficiency by as much as 6 per cent.

Long before it was completed, the model was solving difficult construction problems for crews in the plate shop and on the building ways. Classes in ship design and blueprint reading held regular sessions in the model shop to watch the growth of the scale vessel and to pick up pointers that later proved invaluable on the job.

Measuring 9 feet and 5⅞ inches to represent the Victory ship's 455 feet, the model was constructed from blueprints of its own drawn from plans for the full-scale ship. Chief differences in the superstructure of the Victory ship and the Liberty are the substitution of a Samson post with two 5-ton booms for the Liberty's foremast and the use of a kingpost at each corner of the deckhouse.



Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT

A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

NEW SPECIMEN EXAMINATIONS FOR LICENSED OFFICERS

(Continued from December issue)

Subject: SEAMANSHIP

1. Define dead-weight tonnage.

2. What are cant frames and where are they used?

3. What care must be taken while lowering cargo booms?

4. What circumference manila line would be required for a 3-ton lift, allowing a safety factor of 4?

5. Describe how you would maneuver to avoid the center of a cyclone in the southern hemisphere.

6. What steps would you take toward insuring the recovery of the anchor in the event of its being lost?

7. Riding a lee tide on one anchor and it begins to blow so there is danger of dragging, what would you do?

8. You are on watch, anchored in a 4-knot current, and a vessel ahead breaks loose and is drifting down on you. What would do do?

9. What is your duty if your vessel takes fire at sea?

10. How would you approach a sinking vessel in a lifeboat in rough weather and take the crew off, if it were too rough to go alongside?

Time allowed—2 hours.

Subject: STOWAGE

1. What preparations must be made of a vessel's cargo holds before loading?

2. What care and attention must be given to cargo ports, air ports, gangway ports and like openings in a vessel's side? How must the cargo be stowed in the vicinity of the cargo ports, and why?

3. What is the general rule for distribution of weights in a cargo ship?

4. What is the best method of ventilating a cargo of coal? Is there any risk entailed by the coal being wet when taken aboard?

5. How would you prepare the holds for carrying a full cargo of grain in bulk? What precautions should be taken?

6. What precautions are taken while loading a cargo of cotton?

7. Describe how you would stow a cargo of railroad iron and how you would secure it. Would you stow it grating fashion or solid? If it became adrift in the hold, what would you do?

8. What are some of the most important things to be cared for when loading a deck load?

9. Give three general classes of refrigerated cargo and the temperature they are carried at.

10. Describe the method of gaging oil cargoes. How is the varying volume of oil at different temperatures taken into consideration in figuring the load carried?

Time allowed—2 hours.

Subject: AREA AND VOLUME

1. How much space would be required to stow a consignment consisting of the following:

(a) 375 tons of sugar in bags, stowage factor 42.

(b) 115 rolls of paper, each 36 inches long and 29 inches in diameter.

(c) 987 cases, stowage factor 55 cubic feet.

(d) 213 bales, each 5 by 2 by 2 feet 6 inches.

2. A life raft has 15 air tanks, each tank 20 inches in diameter and 45 inches long. How many persons would this raft be certified to carry, allowing 3 cubic feet of air tank capacity per person.

3. How many tons of salt water will a topside trimming tank hold if it is uniformly right triangular in shape, its end measuring 14 feet in height and 11 feet in breadth, and its length 40 feet?

4. A ship is 175 feet long, 18 feet above water. How many gallons of paint will it take to paint both sides with two coats of paint, if 1 gallon covers 130 square feet?

5. Before discharging a load of gasoline (coefficient of expansion 0.0006) your gaging shows a total of 89,763 barrels at a temperature of 54° F. How many barrels should be listed on the bill of lading?

Time allowed—$2\frac{1}{2}$ hours.

Subject: LIFE-SAVING APPARATUS

1. What equipment is required on buoyant apparatus on ocean vessels?

2. How are air tanks installed in a lifeboat and what air tank capacity is required in metal lifeboats?

3. What is the rule concerning the stowage of freight or obstructions on the decks where lifeboats or rafts are carried?

4. Briefly describe the construction of a cork ring life buoy as prescribed in the Rules and Regulations.

5. Describe the method of firing the Lyle gun.

6. What extra steering apparatus is required on all steamers?

7. Describe and state on what vessels loudspeaker systems are required.

8. Describe the means of detecting and extinguishing fire in the holds of vessels.

9. Adrift in a lifeboat, what equipment could you utilize to signal or attract an airplane or vessel?

10. State briefly the purpose of each of the following:

(a) Flame safety lamp; (b) Navy type canister gas mask; (c) Oxygen breathing apparatus; (d) fresh air hose mask;

(e) respirator.

Time allowed—2 hours.

Subject: RULES AND REGULATIONS

1. State briefly some of the functions of the Merchant Marine Inspection of the U. S. Coast Guard.

2. Describe the fire-fighting apparatus on a vessel you have worked on or are familiar with.

3. Describe each type of fire extinguisher and state how it is recharged and inspected.

4. Where are water-sprinkling systems required?

5. Describe the electrical system of fire detecting.

6. What is the law regarding steering gear and navigating equipment tests before leaving port?

7. On what vessels is a mechanical deep-sea sounding apparatus required to be carried? What is your duty regarding same?

8. What report is required in the event of any collision with a lightship, buoy or other aid to navigation?

9. What is an officer's duty regarding Notices to Mariners?

10. What is the rule regarding unnecessary whistling within any harbor limits of the United States and what is the penalty for its violation?

Time allowed—2 hours.

Subject: GENERAL

1. What are your duties on joining a vessel as second mate?

2. What are the second mate's duties during fire and boat drill?

3. What instruments and other navigational equipment should be on board, in place and ready to use, on a vessel about to proceed to sea? What are the second mate's responsibility and duties in connection with them?

4. In plotting a course, how would you allow for current, the set and drift of which is known?

5. What means are available for determining the speed of your ship?

6. You are steering NE. at 13 knots and meeting another steamer steering SW. and 2 miles from you. Estimating the other vessel's speed as 11 knots, how long will it take you to meet?

7. What does a navigator's day's work consist of when at sea?

8. What advantage is gained by calculating beforehand the watch time of sun's transit?

9. When is the altitude of a celestial body most seriously affected by refraction?

10. If the sun was exactly in your zenith, would the altitude measured with a sextant be exactly 90°?

11. Describe the uses to which the Napier's diagram can be applied and its special advantages.

12. In vessels equipped with gyro compasses, can the gyro compass, alone, be depended on at all times?

13. Explain in detail how you would proceed to put the ship on a required true course, using the sun.

14. Under what conditions are the formulas of plane sailing accurate?

15. Describe the general trend of the Gulf Stream from the Florida Straits and give its approximate velocity.

16. What is a bill of lading, demurrage, and lay days?

17. What vessels are required to be provided with a slop chest?

18. Where and how may motion-picture films be carried on passenger vessels?

19. How would you reeve relieving tackles?

20. Which way will the thrust of a right-hand propeller on a single screw vessel tend to cant the stern when (a) going ahead (b) astern?

Time allowed—3 hours.

BOOK REVIEWS

"Navigation"

By Kells, Kern, & Bland; 479 pages in blue buckram cover, profusely illustrated with numerous diagrams and tables; published by McGraw-Hill Book Company; price $5.00.

Here is an excellent textbook on navigation. Published late in December, 1943, it is a modern, up-to-the-minute, complete course on this vital subject. The best and latest methods in navigational practices are used in the volume, with special emphasis placed on Commander Arthur A. Ageton's short method on mathematical calculations of celestial navigation.

Appealing to the novice in this study is the simplicity of the text, the logical arrangement of material and careful guidance of the student from one phase to another, with each navigational theory given a thorough, independent treatment. Numerous diagrams and illustrations bring out the essential elements of a topic and give a comprehensive view of it. Basic review material on mathematics have been arranged so that the student will gain needed mathematical power while becoming familiar with the important concepts and procedures of navigation.

A graded set of exercises follows each important topic. The first are short and elementary, and call attention to the most essential ideas and refresh the student's memory. After these come the more complicated problems, and finally the difficult problems actually met in practice. When the student has finished he is then ready for the actual chartroom work in navigation.

"Teacher's Manual for Military, Marine, Vocational and Industrial Training"

By Nicholas Moseley, Lieut. Comdr., U. S. C. G. R.; 208 pages (illustrated); published by Cornell Maritime Press. Price $2.00.

If you are a skilled industrial worker who has been drafted as instructor from the bench, assembly line or the drill field, and are faced with the problem of training hundreds of men for military or industrial tasks, without previous teaching experience, this book should be helpful.

The author has skimmed over the surface of the art of teaching and sketchily treated the subject of the military and marine field of instruction. As an approach to this important wartime phase in industry, the sole merit of this book is as an introduction to further studies, and its title should be changed to indicate that fact.

The author has unfolded some fine points, and is acquainted with his subject, which covers a wide field, including the various improvements in methods of teaching, such as the use of motion picture films, latest methods of scoring and testing, and emphasis stressed on the foreign language training, especially in the military field.

Pacific Coast Marine Activities

By Special Correspondents

Jobs for Handicapped Veterans

Taking over the Los Angeles Shipbuilding and Dry Dock Corporation plant at San Pedro, the Todd Shipyards Corporation announces an extension to that plant of its Veteran Rehabilitation Plan, whereby jobs are open at its yards to physically handicapped veterans of the present war. This plan is currently assisting over 1000 honorably discharged service men in the nine Todd plants where it is established.

The Los Angeles Shipbuilding and Dry Dock plant is already employing 65 ex-service men in important jobs, and this number will be substantially augmented. Special consideration is given to handicapped veterans. Of the 164 veterans employed by Seattle-Tacoma Shipbuilding Corporation, Seattle, Washington, 52 are physically handicapped.

A Tanker Saved

To Capt. G. A. Johnson of Alameda, California, goes an orchid of official commendation for his good judgment and prompt action in saving the tanker W. S. Rheem and the bulk of her cargo during a submarine attack after she had been torpedoed. The tanker is owned by the Standard Oil Company of California and operated by them for the War Shipping Administration. She was built in the Alameda yard of the Bethlehem Shipbuilding Co. in 1921. She is 500 feet long; has a cargo capacity for 119,495 barrels of oil; is propelled by twin screws driven by triple-expansion engines, taking steam from three single-ended Scotch marine boilers; and has a sea speed, loaded, of 10¼ knots.

At the time of the attack, this tanker was loaded with her regular bulk oil cargo and 850 steel drums of lubricating oil in the forward hold. The captain on the bridge, sighting a torpedo coming from the port quarter, swung his ship to starboard, and as this maneuver was executed a second torpedo passed close under the stern. A moment later a third torpedo struck the port bow and the impact was followed by a terrific explosion that shattered or buckled everything forward and filled the forward hold with water. The captain ordered the crew to prepare to abandon ship and had "sparks" send out an SOS. Then he made an appraisal of the damage, found that the bulkheads were holding forward and that the sea had put out the fire.

So Capt. Johnson, his officers and crew all got busy transferring drums of lube oil from the tangled wreckage forward to the after end of the main deck, and pumping oil cargo from the forward tanks aft.

The tanker, with a bunch of wreckage for a bow, crept home at a snail's pace, using her twin screws to help out in steering when there was not sufficient way on the hull. The fuel-oil cargo was saved, and of the 850 drums of lube oil 535 were saved. The W. S. Rheem has since been repaired as good as new and is now delivering vital fuel cargoes to the war fronts.

Tin Fish Moves

The famous Tin Fish Club recreation headquarters at San Pedro for the United Seaman's Service is mov-

TOURING MARINSHIP YARD

Veteran shipbuilder Joseph N. Pew, Jr., chairman of the board of Sun Shipbuilding and Drydock Co., of Chester, Pa. (second from left), tours the Marinship Corp. tanker yard on the shores of San Francisco Bay. His official hosts were (from the left), Marinship President K. K. Bechtel; John Anderton, yard superintendent; and Jack Hardie, general superintendent of ship construction. Mr. Pew paid tribute to the yard's method of prefabricating complete deck houses and other large pre-hull assemblies. *(Photo courtesy Marinship)*

ing from 838 S. Palos Verdes Street to a downtown location at 327-329 W. Sixth Street, where there will be seven times as much floor space available.

Tuna Clippers at San Diego

The advent of the new year found the San Diego boatyards entrenched with a good backlog of orders for new fishing vessels, the majority of which will be diesel powered.

The Lynch Shipbuilding Company has one 110-foot tuna clipper for Manuel Rosa, to be driven by an 8-cylinder 525-hp Enterprise diesel engine, and to have two Caterpillar D-4600 6-cylinder diesels driving 75-kw generators; three 96-foot clippers, all identical, driven by 6-cylinder 400-hp Enterprise diesel engines, and to have two 6-cylinder 108-hp Caterpillar diesels driving 75-kw generators.

The Harbor Boat Works has undertaken an ambitious program, and is not only building boats on direct order by has plans for stock boats to be built at once. This will put the yard in a position to make early delivery to buyers coming late into the market, as when the fish start to run, one boat on the ways is worth two on the drawing board.

San Diego Marine Construction Company is still busy with Navy contracts but has re-entered the commercial fishboat field and has on order one 90-foot clipper for George Alamito and Ted Cantos. This boat will be powered with a 320-hp Atlas Imperial main engine and two 80-hp Atlas Imperial diesel auxiliary engines.

The Campbell Machine Company has five 143-foot tuna clippers powered with 600-hp Union diesel engines supercharged to 900-hp. Auxiliary power will be two 6-cylinder 175-hp Union diesels direct connected to 125-kw generators.

Kettenburg Boat Works is very busy with a naval contract involving 30 gasoline-powered plywood plane rearming boats. In addition the yard is building or has on order sixteen 38-foot jig boats of standard hull design and four 32-foot jig boats, also of standard design. Due to the difficulty in getting engines, the power plants have not been fully decided upon, but all the 32-foot boats and five of the 38-foot boats will be powered with Chrysler Crown gasoline engines. Of the balance, some will be powered with Caterpillar 60-hp, 6-cylinder diesels, Caterpillar 40-hp 4-cylinder diesels, or Lorimer 40-hp 4-cylinder diesels, as they may become available.

READY FOR TROUBLE

Merchant marine seamen are shown in the picture stowing supplies on a life raft soon to be placed on their ship, repairing at Todd-Seattle Dry Docks, Inc. Each raft of this type is designed to carry 20 persons. Their equipment consists of first-aid kits, distress signals, drinking cups, lanterns, life lines, matches, oars, rowlocks, signal flags, sea anchors, drinking water, signal mirrors, canvas for protection from the sun, and malted milk tablets.

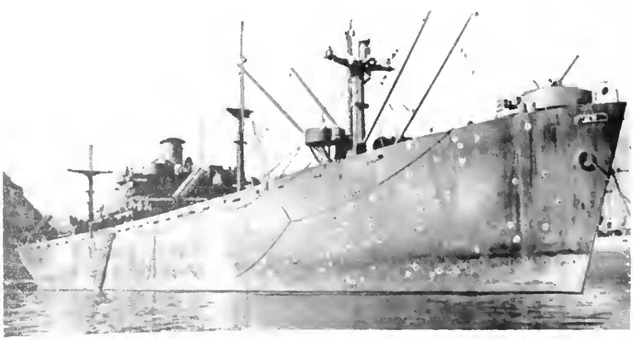
Purse Seiners

Five of Seattle's largest purse-seine vessels have been tied up as a result of the Government's pilchard order issued last fall by Coordinator of Fisheries Harold Ickes.

The fishermen who operated from August to December on the California pilchard banks returned to Seattle to fish for shark during January, February and March, as in previous years, but found that the Ickes pilchard order in effect had frozen their vessels in that fishery. With their crews dispersed, they were unable to return to California to complete the pilchard season set by the Government to end on February 15. The vessels made idle by the order are the Marconia, J. B. Edwards, Vashon, Westward and Harmony.

AN UNSINKABLE SHIP

Captain Elmer J. Stull, master of the Liberty ship Samuel Parker, which was shot full of holes while taking part in the invasion of Sicily, paid a visit to Seattle in December and brought this picture of the hull-riddled ship with him. The ship was bombed and strafed and finally set afire by the enemy.



Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

Forged Valve Bodies

General Metals Corporation has announced the production on the West Coast of forged valve bodies. While these are not new to the East, the company has recently installed equipment which will now make available high-quality forged valve bodies to the West. They are produced in sizes from ½ to 2 inches, and will withstand pressures up to 600 pounds per square inch.

Forged valve bodies by General Metals.

This development is in line with the company's plan to provide an increasingly broad and comprehensive source for high-quality castings and forgings to industries of the West.

Diversification is not limited to products alone. Plant facilities are equally well dispersed, providing opportunity for service. Three plants in Oakland produce steel, gray iron and malleable castings; three plants in Los Angeles produce malleable iron castings and press and drop forgings. The Houston plant manufactures drop forgings.

New Pressure Regulator

Victor Equipment Company, San Francisco, announces a new pressure reducing regulator, Model No. 4000-1000 Pilot Type, combining several interesting features.

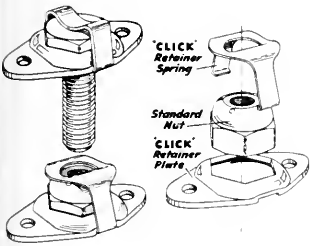
This particular regulator is available for inlet pressures up to and exceeding 4000 psi and for delivery pressures up to and exceeding 1000 psi. Designed particularly for the purpose of refilling to 400 and 800 psi respectively smaller cylinders from cylindrical manifold systems, this regulator will fully meet any similar requirements.

The manufacturers claim the following advantages for this regulator:

(1) Greater pressure accuracy. A specially-designed diaphragm is gas-loaded instead of spring-loaded and is so constructed that damage to or rupture of that diaphragm is virtually impossible.

(2) The loading pressure of the main regulator is controlled by a built-in pilot regulator, the tension screw of which is so arranged that it will not permit a diaphragm loading pressure beyond a predetermined maximum. Since the major regulator's diaphragm is controlled by this pilot regulator, any pressure loss is automatically compensated for by this regulator. Should the loading pressure exceed a desired maximum, an adjustable relief valve will reduce this pressure to normal.

(3) If the operator wishes to diminish a previously set operating pressure, he merely releases the tension screw of the pilot regulator and exhausts the dome pressure by a non-leak release valve.



Left: The "Click" nut and bolt retainer.

Right: New 3-ton Lowlift truck.

New Nut Retainer

Of particular interest to design and production men, "Click," a new type of nut and bolt retainer, produced by Kaynar Manufacturing Co., Los Angeles, is adaptable to any aircraft, marine or ordnance nut or bolt, and is interchangeable with present types of anchor fittings, except where slightly greater width would cause interference.

Approved by the U. S. Army Air Corps and C. A. A., Click's simple design consists of a retainer plate and a retainer spring, both of cadmium-plated tempered spring steel.

Incorporating the features of standard anchor nuts, Click also provides a nut anchor that can be spot welded to the assembly without affecting its serviceability as well as a bolt anchor using standard AN bolts, both with axial flexibility. It also allows the conversion of nut plates to blind studs without tooling change while the part is in production.

With Click, stud retainers can be riveted or spot welded early in production and the bolt inserted and locked in place with the retainer spring any time later.

Click's easy removability eliminates the problem of stripped nut removal and allows the use of dural nuts in certain applications. Its attaching dimensions are held to .002″, which eliminates line drilling of assemblies and allows prefabrication of holes, speeding installation and insuring perfect alignment. Its use also provides a practical solution to the problem of hard-to-reach nuts that are required to be positively locked by cotter pins.

New 3-Ton Lowlift Truck

Type E-3 is the designation of a new 6000-lb.-capacity Lowlift truck, announced by the Baker Industrial Truck Division of The Baker-Raulang Company, Cleveland, Ohio.

This heavy-duty elevating platform truck retains all of the features of previous models plus greater simplicity, accessibility and ruggedness of construction. All units are totally enclosed, and great care has been used in the selection of the material for each part.

The truck is designed for operation in intersecting aisles 67″ wide, has an overall length of 123¾″, an overall width of 42¾″ and an overall height of 55″. The platform is 26½″ wide, 54″ long, and 11″ high in the low position and has a vertical lift of 6″.

The platform travels vertically on ball-bearing rollers running in upright channel guides. Power is supplied by a single hydraulic jack, travel being compounded by sprockets and roller chains. Oil at the required pressure is supplied by a motor-driven gear pump, and the control lever on the top of the control panel starts the pump motor and closes the valve, forcing oil into the jack cylinder. Lowering is by gravity controlled by the same lever. A mill-type contractor takes motor circuit arcing. A limit switch shuts off the pump motor at the upper limit of travel, with auxiliary safety provided through a relief valve. The truck employs Baker totally-enclosed ball-bearing motors designed particularly for industrial truck service. They have an overload capacity 300 per cent of rated load for 30 minutes with temperature rise not exceeding 65° C.

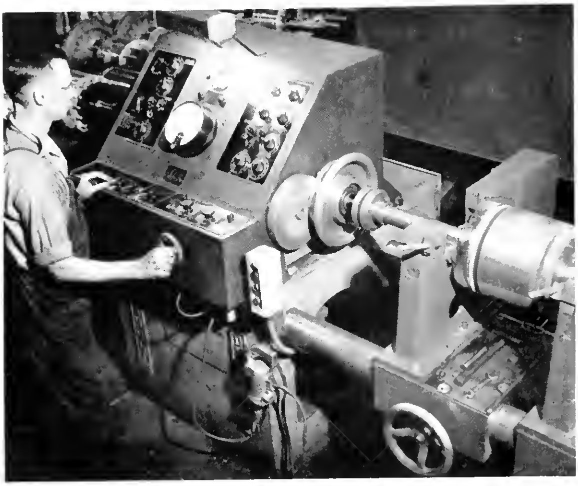
Plastic Precision Instruments

Due to the shortage of metal and the ever-growing and urgent demand for precision instruments by the armed forces, new materials and new methods of obtaining the desired accuracy had to be found and developed.

It is claimed that The Emeloid Co., Inc., Arlington, New Jersey, have perfected such material, known as "Emeloid," and patented processes by which this material could be accurately fabricated, with the result that today the company is not only supplying the armed forces with large quantities of such instruments used for rapid and accurate calculating on the battle fronts but in the camps and schools throughout the world. Emeloid instruments, it is said, are light in weight, low in cost, accurate, and employ no strategic metals or rare materials.

The company has a large department devoted solely to the manufacture of scientific instruments of every type—from slide rules up to the most complicated artillery and navigation charting and calculating instruments.

A plastic precision instrument.



Precision Balancing

Unbalance of armatures can be located in one-eighth to one-tenth the time required for mechanical balancing with this dynetric balancing unit used by Westinghouse at East Pittsburgh. It is possible to precision balance armatures for 50-hp to 200-hp motors to 1/10,000 of an inch of linear movement. Recently 1000 armatures were balanced on this machine.

The operator proceeds as follows: (1) Places the shaft of the armature in floating bearings; (2) connects the armature shaft to that of a motor-driven sine wave generator; (3) Adds a known weight of molding clay to one end of the armature at the 0 reference point of the sine wave generator index wheel; (4) rotates armature at 600 rpm; (5) manually adjusts sine wave generator until the rotor is in phase with the stator, at which point the armature is in balance with the machine; (6) weight of metal necessary to bring one end of the armature in balance is read on the scale of the large instrument in center of panel; the horizontal movement of the armature, due to vibration, is transmitted by the floating bearings through a mechanical connection to an electrical coil, whence it is electrically transmitted to electronic tubes which amplify the unbalance so it can be recorded by the instrument; (7) sine wave stator index wheel indicates place on armature with respect to 0 reference point of the sine wave generator index wheel where the weight that was read on the instrument must be added to bring that end of the armature in balance. The operator then repeats these steps for balancing the opposite end of the armature.

New Centrifugal Pumps

New vertical double suction, single stage centrifugal pumps recently introduced by Goulds Pumps, Inc., Seneca Falls, N. Y., are designed for use on shipboard where deck space is at a premium. They can be used for circulating fresh or salt water, and many other services.

The interior of these pumps is readily accessible without disturbing pipe connections. The stuffing boxes and bearings also are designed to provide ready accessiblity for examination and maintenance.

New Type Marine Blowers

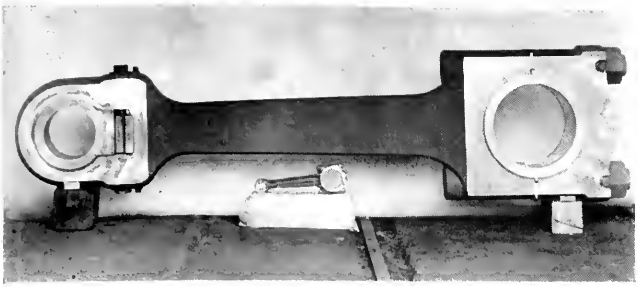
A new series of marine blowers, entirely die-formed of non-critical steel, is announced by Trade-Wind Motorfans, Inc., Los Angeles, makers of marine fans and blowers.

This manufacturing technique permits much more rapid production to closer tolerances at lower costs.

The blowers are of particularly rugged construction. Scroll stampings are die-formed of heavy gage steel in two halves. The scroll, outlet flange and inlet collar are spot welded together and then hot-dipped galvanized for corrosion protection. A die-formed housing encloses the motor for either 6-, 12-, 24- or 32-volt direct-current operation, the cap of which is easily removed for motor inspection by removing two screws. This enclosure insures safety and efficient motor operation. The motor is rubber mounted in its housing, which is solidly bolted to blower scroll.

This construction permits the removal of motor and blower without disturbing the housing. A Navy type terminal tube for Navy wiring is provided on motor housing. All of these blowers carry Standard Test Code Ratings and have been standardized in three sizes from 185 cfm to 500 cfm for quick delivery.

Marine blower.



Mutt and Jeff in connecting rods.

Connecting Rod Comparison

An indication of the wide variety in sizes of power units being produced by American industry to hasten Allied victory is evidenced in the pictorial comparison of the largest and smallest connecting rods that go into products of The Cooper-Bessemer Corporation, whose peacetime engine and compressor production has long since been diverted and increased to meet current war demands.

The big "Mutt-sized" connecting rod, weighing 6000 pounds, is approximately 10 feet long and goes into huge compressors used in the production of war materials such as helium, synthetic rubber, high octane gasoline, and TNT for blockbusters.

The small "Jeff-sized" rod is for the smallest engine cylinder size in the line of Cooper-Bessemer diesels. Only 14 inches in length, it is a vital part of one of the many different engine types for industrial, municipal, locomotive and marine power built by this engine builder of Mount Vernon, Ohio, and Grove City, Pennsylvania.

Diesel-Driven Air Compressors Contribute to Shipyard Efficiency

One of the most impressive contributions toward assisting the nation in its successful shipbuilding program has just been disclosed by The Cooper-Bessemer Corporation of Mount Vernon, Ohio, and Grove City, Pennsylvania.

In addition to supplying diesel engines for main propulsion use and diesel-driven generating sets for auxiliary power on shipboard, this veteran engine builder is also furnishing diesel compressor units which compress air for driving pneumatic tools and equipment vital to ship construction.

At Sun Shipbuilding and Drydock Company at Chester, Pa., nine Cooper-Bessemer Type G-MV diesel-engine-driven compressors have been in day and night operation for nearly two years, furnishing air power for the various tools and equipment which play an important part in building up our fleets of cargo and fighting vessels.

These compressor units consist of four-cylinder, V-type engines, rated 375 horsepower at 330 revolutions per minute. Each unit has two compressor cylinders, one of which is direct connected to each crank-throw, affording two stages of compression.

The Type G-MV engines compress air from atmospheric pressure to a discharge pressure of 110 pounds.

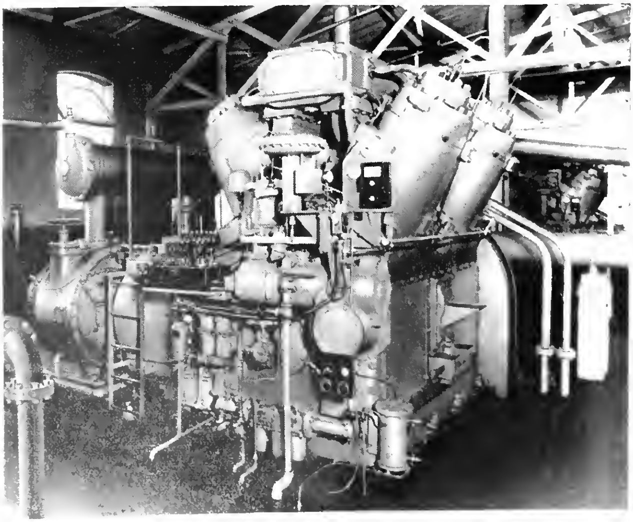
All nine units were supplied complete with inter coolers and after coolers for maintaining the desired compressed air temperature, and with heat exchangers for maintaining proper jacket water temperature.

Due to the wide variation in the number of compressed air tools that may be in use at any time, each unit is equipped with an automatic speed control, developed by company engineers, which assures a constant air pressure at all times and a minimum of fuel consumption. This feature is of particular value, not only to shipbuilding but also to compressor users in the oil, gas and synthesis industries, where effective control is a necessity.

Designed to meet emergency conditions arising from a possible shortage of fuel oil, these units can be readily converted from present oil fuel operation to gas should the need arise.

As this firm is one of the nation's key producers of diesel engines for ship propulsion and other marine service, many of the vessels which such air-powered equipment is helping to build are also equipped with diesel marine engines constructed by the same company.

One of the nine Cooper-Bessemer Type G-MV compressor units that supply constant air power for operating the scores of pneumatic tools at the Sun Shipbuilding & Drydock Company yards.



On the Ways—

SHIPS IN THE MAKING

S. S. Daulton Mann Launched

A lifetime of service to the building up of the American Merchant Marine, and particularly of the shipping interests of the Pacific Coast and San Francisco, was recalled in the launching on January 19 at Richmond, Calif., of the Liberty ship Daulton Mann, named after the late executive vice president of the Grace Line. With their presence at Shipyard No. 1 of the Permanente Metals Corporation, numerous San Francisco Bay area shipping men paid tribute to his memory.

The vessel was sponsored by Mrs. Daulton Mann, who was here from New York for the ceremony. Her sister, Mrs. Stuart Haldron, served as matron of honor. They are members of a pioneer California family. Mrs. Martin Quinn was flower bearer. Claude King, who was associated with Mr. Mann in the days of the old Pacific Mail Steamship Company, pulled the trigger that sent the vessel down the ways, and William R. Wallace, Jr., spoke during the launching.

Troopship General Hase Launched

The tenth troopship built by the Kaiser Co., Inc., Richmond Shipyard No. 3, the General William F. Hase, floated out of the basin on December 15, 1943, at Richmond, California. Mrs. John E. Wood, Jr., of La Jolla, Calif., daughter of General Hase, christened the vessel at ceremonies, and had as her flower girl Miss Anna Moore of San Francisco, daughter of Major General George F. Moore, who commanded the defenses at Corregidor. He is now prisoner of war on the Island of Formosa.

The ship was named for the late Major General Wm. F. Hase, who was decorated with the Distinguished Service Medal for his services as an artillery officer in World War I, later serving as Chief of Staff of the Hawaiian Department and Chief of Coast Artillery in the War Department at Washington.

Named for the late executive vice president of W. R. Grace & Co., the Daulton Mann was launched at Shipyard No. 2 of Permanente Metals Corp., Richmond, Calif., on January 19. Left to right are: Mrs. Martin Quinn, flower girl; Mrs. Stuart Haldarn, matron of honor; Chaplain Andrew C. Preston, U. S. N.; Claude E. King, triggerman; Mrs. Daulton Mann, sponsor; and William R. Wallace, Jr., speaker.

On December 31 the Seattle-Tacoma Shipbuilding Corporation launched the destrayer Watts, 24th ship to be built at its Harbor Island plant. Mrs. Judith B. Gardner, shown in insert, was sponsor.

Northwest's 25th Destroyer Launched

Seattle-Tacoma Shipbuilding Corporation on January 29 launched its 25th destroyer from the firm's Seattle yard. The launching caused much interest, as it meant that all of the 25 ships of the original contract placed by the Navy Department with Sea-Tac had been sent down the ways. These included 10 destroyers of 1750 tons and 15 of 2100 tons displacement, representing a Government investment of more than $175,000,000.

First Victory Ship Launching

America's first Victory ship, the United Victory, was launched on January 12 from the yards of the Oregon Shipbuilding Company in Portland. One of the freighters, which are expected to form the backbone of the United States post-war fleet, she is more rakish and faster than the Liberty ship. She carries the same amount of cargo, but has more than three times as much propulsion power, producing 15 knots or better speed as compared with 11 knots or better for the Liberty. The United Victory was on the ways 54 days. It will be 30 to 40 days before she is completed. Eventually the yard expects to reduce the total time to 50 days a ship from keel laying to delivery.

Left: Captain Ruiz of the Chilean Navy (in background) and (left to right) Russ Brown, yard superintendent; M. G. Vanderwende, executive assistant manager of Yard No. 1; and T. A. Bedford, assistant manager of Yards Nos. 1 and 2.

Perm-Metals First Victory Keel

Richmond shipyards began a new era of shipbuilding on January 17 with the laying of the keel for the first Victory ship to be built under a contract calling for erection of 77 Victory ships by the Permanente Metals Corp. this year.

The keel was laid at Shipyard No. 1 by officials of the company in the presence of hundreds of employees. Representatives of the workers spoke briefly, pledging continued coopera-tion in an all-out effort to build up the American merchant marine for the knockout punch against the Axis.

Russ Brown, yard superintendent, was master of ceremonies. He called on leaders of the various shipbuilding crafts, as well as M. G. Vanderwende, executive assistant manager of Yard No. 1, and T. A. Bedford, assistant manager of the Permanente Metals Corp.

The Victory ship program will carry forward the activity in Richmond yards throughout the year, and, the officials said, may result in an increased need for man power. The new ships, faster and larger than Liberty ships, will be of 14,900 deadweight tons and have a speed expected to exceed Liberty ship speed by about 50 per cent. As their construction progresses, the yards will continue the program of Liberty ship erection necessary to complete their contract with the Government.

Right: Nearer completion than any war vessel launched at Lake Washington Shipyards, the seaplane tender Bering Strait was sent down the ways on January 15. Main engines, reduction gears, auxiliaries, piping and boilers were in place, and the ship will require much less work at her outfitting dock than any other launched from the plant.

Seaplane Tender Launched

When the seaplane tender Bering Strait was sent down the ways from Lake Washington Shipyards on January 15 she carried with her a good-luck bottle of Bering Sea water. Scooped out of the Bering Sea off Nome, the water was flown from Nome to Fairbanks by Captain Larry Mudgett in a Pan-American Lodestar, and flown to Seattle by Captain Frank Fuller. The bottle of sea water will hang in the captain's cabin as a good-luck omen. The sponsor of the tender was Mrs. George F. Cornwall of Portland, Oregon.

The Twenty-seventh Baby Flat Top

The escort airplane carrier Rudyard Bay, 27th midget carrier from the Kaiser Company's Vancouver, Wash., yard, was launched on January 12. The vessel was christened by Mrs. Ernest Peck, wife of a Navy captain.

On November 28 the U. S. S. Nehenta Bay was launched at Kaiser Company's Vancouver, Washington, yard. Mrs. Robert H. Lewis, wife of Major General Lewis, Commanding General, Northwestern Sector, Fort Lewis, Washington, christened the ship.

The Liberty ship Charles Paddock on the ways at Calship just before her launching at 10:30 P.M. on December 26. She was named in honor of Capt. Charles W. Paddock, U. S. Marine Corps, and was the 308th ship launched from the Terminal Island ways of the company.

Calship Honors Newspapermen

Jack Singer and Charles Paddock were commemorated late in December, when Liberty ships were named in their honor and launched from the California Shipbuilding Corporation ways at Terminal Island.

Jack Singer, war correspondent for the International News Service, was killed on September 15, 1942, when the U. S. S. Wasp was torpedoed by a Jap submarine. After Pearl Harbor he asked for foreign service, and was assigned to a naval task force in the Pacific. At the time of his death he was seated in front of his typewriter in the officers' wardroom writing in his log, shortly before an expected clash with an enemy battle force. At the launching many newspapermen paid tribute to him and to the cause for which he died.

Charles Paddock was known to millions of American youths as a famous sprinter as well as newspaperman. His journalistic career brought him much fame, and he was connected with several Southern California papers. In 1942 he took leave from duties as general manager of the Pasadena Star-News and Pasadena Post to enter the Marine Corps, where he held the rank of captain. He was killed on July 11, 1943, in a military plane crash near Sitka, Alaska.

Beth-Fairfield's 300th Ship

The crowds cheered and music blared from loud speakers as with a mighty splash across her bow the S. S. Samforth slid down the ways of the Bethlehem-Fairfield Shipyard on December 23. Sponsor was Mrs. William C. Hoffman, wife of an employee in the boiler department. This was the 300th ship built at the yard, and was 20 days under construction.

The name Samforth is a combination of Sam, in honor of Uncle Sam, and Forth, after the Firth of Forth, in Scotland. This vessel is among others being consigned to Great Britain. The suffixes of the names of ships built for Great Britain are named after geographical locations in the British Isles, with "Sam" first, to tie in the United States as an ally, the names of rivers so far being used. Recent launchings include the S. S. Samclyde, S. S. Samettrick, S. S. Samcree, S. S. Sameveron, S. S. Samfeugh, S. S. Samtay, S. S. Samouse, S. S. Samchess and the S. S. Samnid

Included in the 300 ships are an unspecified number of LST landing vessels built for the United States Navy.

Recent Launchings at Consolidated

The launching of two C-1 cargo and passenger vessels built for the United States Maritime Commission by Consolidated Steel Corporation's Long Beach and Wilmington yards has brought to 614 the total number of vessels built from its six plants. Of these vessels, 579 have been delivered to the United States Navy and the United States Maritime Commission. Included in these vessels are destroyers, escort vessels, mechanized landing craft, barges, frigates, Navy transports, Navy hospital ships, and C-1 cargo and passenger vessels.

The S. S. Cape Carchway is a C-1 cargo and passenger vessel built for the Commission, and is the 74th ship to be launched from the Wilmington Shipbuilding division. She was sponsored by Mrs. W. Blake Irvin, whose husband is assistant chief draftsman in the hull engineering department at Wilmington.

The S. S. Cape Martin, also a C-1, was the 14th ship to be launched from Consolidated's shipbuilding division in Long Beach, and was sponsored by Mrs. Lawrence H. Baird, whose son's name was drawn in employees' drawing at that yard.

TACOMA LAUNCHING

Second of a series of seaplane tenders ordered from the Seattle-Tacoma Shipbuilding Corporation, the Hamlin was launched on January 11 in Tacoma. She was christened by Miss Constance Taffinder, daughter of Rear Admiral S. A. Taffinder, U.S.N., commandant of the 13th Naval District, Seattle. The ship is named for a sound on the coast of South Carolina.

(Official U. S. Navy Photograph)

BARGE BUILT IN WASHINGTON

Left: A wooden ocean-going non-propelled barge built for the War Department in the Sagstad plant at La Conner was sent down the ways on January 1. Indians of the Puget Sound country were in charge of the launching program. The barge was the fourth of her size and type launched from the plant.

Northwest Wooden Barge Yard

The Sea-Bell Shipbuilding Company's plant on the Duwamish Waterway, Seattle, demonstrated its speed and efficiency on December 30 when it launched its fourth seagoing wooden barge of an order for five from the Maritime Commission, 100 per cent completed and ready for service. The vessel was christened by Mrs. Joseph Razore, wife of the president of the company. Miss Margaret Repatto (a sister of the sponsor), who is a student at Stanford University, was the co-sponsor. The Sea-Bell vessels are constructed almost entirely of materials from the State of Washington.

1943 Record of Associated

Associated Shipbuilders, with plants on Harbor Island and Lake Union, Seattle, entered 1944 with a total of 26 warships delivered during 1943. During the ceremonies on December 31 at the Harbor Island plant, which accounted for 16 of the total, four ships were commissioned. Captain H. N. Wallin, U. S. N., supervisor of shipbuilding for the Seattle area, praised the company's work for the year.

"A very difficult goal had been set," Captain Wallin told assembled workers, management and guests. "You have met it. Congratulations to both management and production forces. You have set a record of which you may well be proud."

A 12th Naval District Launching

The U. S. S. Flint, a light cruiser built at the Bethlehem shipyards in San Francisco, was christened in the traditional manner on January 23, but actual launching of the vessel awaited the abatement of high winds.

Mrs. R. A. Pitcher, first gold star Navy mother of Flint, Mich., designated by Mayor Osmond Kelly of Flint as sponsor of the ship bearing the city's name, broke the champagne bottle across the bow.

Her husband and Mayor Kelly were among the party attending the ceremony at the shipyard. Mr. and Mrs. Pitcher's son was killed on the battleship U. S. S. West Virginia at Pearl Harbor.

Cut in Barge Contract

Because self-propelled ships are now available in sufficient number to handle cargoes of strategic bauxite, base of aluminum, a contract for construction of 26 non-propelled concrete barges has been cut to 20, the U. S. Maritime Commission stated. The contract is held by Barrett & Hilp, South San Francisco, California.

Allocation to the Army, Navy and the West Coast grain trade has taken care of the 20 already built or under construction. No use being found for the other six, the keels will not be laid.

Honors Non-American War Correspondent

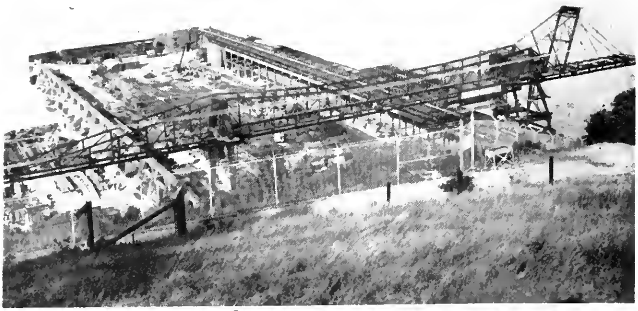
The first Liberty ship to honor a war correspondent not an American citizen was launched on December 18 from the Houston Shipbuilding Corporation yard at Houston, Texas, an affiliate of Todd Shipyards Corporation. The S. S. Harry Percy was named after the English newspaperman who died while on his first war assignment after serving 15 years with the London Bureau of the United Press. Sponsor of this ship was Mrs. Madonna Todd Bartlett, wife of Allan C. Bartlett, editor of "The Houston Press."

U. S. S. TULAGI LAUNCHED

Captain James D. Barner, U. S. Naval Station, Pre-Commissioning Detail, Astoria, Oregon, addresses the gathering at Kaiser Company's Vancouver, Washington, yard at ceremonies held on November 15 at launching of U. S. S. Tulagi. Mrs. Barner was sponsor.

FORTY-FIFTH TANKER LAUNCHED

Shown at the launching of the S. S. Jacksonville, 45th tanker to be launched at the Swan Island yard of Kaiser Company, are Mr. and Mrs. Kenneth L. Smith. Mr. Smith is rate control manager of the three Kaiser yards in the Portland area; Mrs. Smith acted as sponsor.



(U. S. Navy official photographs)

Crane and Scrap Steel

The U. S. Navy has for many years maintained a coaling station on San Francisco Bay. This is located at a site known as California City on the Tiburon peninsula near Tiburon. For several years no use has been made of this station, and the coal-handling and storage equipment there is now for sale.

Bunkers of structural steel with an aggregate length of 600 feet, and one of the largest gantry cranes in the United States, compose the principal part of the material to be sold.

This gantry has a span of 219 feet and a total length of 447 feet, with 32 feet clearance from rail to bridge.

The electric equipment for the crane includes one 150-hp, 220-volt d.c. motor, three 65-hp, 220-volt d.c. motors, and a motor generator set to convert commercial a.c. to d.c. for driving these motors. Complete controls, conduits, wiring, are all included. For details see Navy Supply Officer at Mare Island Navy Yard.

BOOK REVIEWS

"Blueprint Reading for the Shipbuilding Trades"

By August E. Niederhoff; 88 pages, bound in blue buckram, excellently illustrated; published by McGraw Hill Book Co. Price $2.00.

Orthographic projections, isometrics, perspective drawings, might not mean much to you unless you are a mechanical draftsman, but in the shipbuilding trade to a beginner learning to read blueprints these words are part of a day's work. These and other ship terms and symbols come naturally when explained in the clear, concise manner presented in this volume.

The author has given his students, who have had no previous experience in the reading and making of blueprints, a textbook starting with the rudiments of blueprint reading, then plunging directly into their use in the shipbuilding trades. Numerous examples are provided along with problems to test the student's ability to understand the text at the end of each chapter.

An excellent glossary of all useful shipbuilding terms, abbreviations, symbols, etc., is provided to make this a reference book for laymen, draftsmen, engineers and shipfitters. The illustrations have been set up in blueprint form to familiarize the reader with that type of drawing.

This book has been actually tested and proved of value, as it is the textbook used in the War Production Classes in Portland, Oregon. Those classes had been using it for 18 months prior to its present publication.

"Knots, Splices and Rope Work"

By A. Hyatt Verrill; revised by E. A. McCann; 146 pages, paper bound, thoroughly illustrated; published by Norman W. Henley Publishing Co. Price $1.50.

Did you know there were 772 different knots? Incredible as it may seem, an ex-Navy commander is said to know that many. This book does not go into these 772 types but does cover the essential knots, splices, bends and hitches that the novice as well as the mariner should know This most interesting art is not new nor is this book trying to present it in a new light; the only motive is to help the surprisingly many people who cannot tie a correct knot to do it easily and to save time and toil. Any hitch is bound to be a success if one applies the information contained in this book.

Hot off the Press

"Westinghouse Builder of Marine Equipment" is the title of the 1943 Marine Engineering and Shipping Review catalog high lighting the marine equipment of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Among the equipment illustrated are the geared-turbine propulsion and turbine-electric propulsion generators, and diesel - electric propulsion, and turbine-generator units and auxiliary turbine drive, steam condensers and air ejectors, switchboards and dc marine motors and controls.

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The Cooper-Bessemer Corporation published in July a very instructive booklet on Plant Accounting and Control, entitled "Accounting and Control Manual," designed to acquaint their own employees with various departmental functions, the regulation of which enables management to assure continued profitable production of the company's products. And now this attractive 45-page booklet is offered to others as an educational aid in furthering their knowledge of principal methods and procedures essential to plant operation.

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The Diehl-Lite, Bulletin No. 2031, recently printed by the Diehl Manufacturing Company, electrical division of The Singer Manufacturing Co., Somerville, N. J., describes and illustrates the light, its uses and effectiveness in assembly, precision machine operation, and other plant operations which require the best possible lighting for precision work.

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A new 12-page booklet entitled, "Safety Regulations for Women in Industry," is being distributed by General Electric to its women employees. The booklet invites the cooperation of all women, especially new workers, in following these safety practices, which the company has found effective by past experience, and which are especially directed to women working on machines and on men's jobs. The publication is not intended as a complete safety guide, but as a supplement to the company's Red Book of "Safety Instructions and Information."

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Stainless-Clad Steel is the subject of a new catalog published by The Jessop Steel Company of Washington, Pa., pioneers of stainless-clad and other composite steels. Included in this helpful literature is information on analyses, applications, manufacture, fabrication, styles of heads and standard size of sheets and plates. It also gives a comprehensive explanation of the exclusive patented "assembly method" used in producing this steel. There are sections on deep drawing, grinding, polishing, cleaning, gas-cutting, riveting, soldering and welding.

"Chicago Pumps for Marine Service" is the title of Bulletin 31C, put out by the Chicago Pump Company, an engineering handbook on marine centrifugal sewage and garbage pump application for ships of the U. S. Maritime Commission, Army Transport vessels and the U. S. Navy. Dimensions, charts and illustrations are included.

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I-T-E Circuit Breaker Co. of Philadelphia, Pa., has recently published a catalog on Type KC-KB-KA circuit breakers. Various views of installations, dimensions and diagrams of connections for manual and electrical operation, and descriptive matter, comprise this catalog.

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The Quickwork Division of Whiting Corporation, Harvey, Ill., announces publication of Bulletin QW-115, describing the new, improved type of Quickwork stamping trimmer. This machine trims, forms, beads or flanges large and small stampings in straight line production or job shop work.

Another bulletin recently published, No. QW-116, illustrates various types of special welding positioners developed and built by Whiting.

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"Electrical Instruments, Principles of Operation," is the title of a new General Electric publication, which presents a concise discussion of the characteristics of instruments, what makes them operate, and the individual limitations of the various types. It is designated GET-1173.

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Bulletin No. 154, "Tungsten Electrodes," recently published for the Callite Tungsten Corporation of Union City, New Jersey, describes the application of Callite tungsten electrodes by atomic-hydrogen, helium and argon arc welding, and gives complete data on the time-saving tungsten electrodes available.

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"Thermobonds," the new insulation bulletin issued by The Sterling Varnish Co., Haysville, Pa., describes ten insulating mediums that have been thoroughly tested in the applications for which they have been produced by subjecting them to excessive heat, heavy overloads and atmospheres crowded with acid or al-

kali fumes and abrasive materials. The thermobonds are produced for application to such units as high-speed armatures, high-cycle drill and grinder motors, heavy duty motors and transformers, and marine engine magneto coils.

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"Parker Hydraulic Cable Stretcher" is the title of a bulletin printed by the Parker Appliance Company, Cleveland, Ohio. This improved machine is for stretching and testing assembled aircraft cables. It is a fully-enclosed, self-contained cable stretcher, easy to operate, and has automatic timing, accurate pressure adjustment, and a tension range from 100 to 3000 pounds.

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A bulletin from Fawick Airflex Co., Cleveland, Ohio, is devoted to descriptive matter and illustrations of their clutch, which employs the basic principle of controlled air pressure and has proved itself in many types of service. Details of construction and typical applications are brought out in this bulletin, No. 200. There is also a description of Rotorseal, a device for introducing air or oil under pressure to rotating shafts.

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Sperry Products, Inc., of Hoboken, N. J., has published a bulletin about the Exactor hydraulic controls for operation in industrial, marine and aircraft equipment. The important advantages emphasized about this control are the easy and inexpensive installation; efficient and "exact" operation; maintenance-cost-free service; and quick, simple relocation.

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Executone Communications Systems of New York City have recently published a Catalog-Survey Chart, Form 185, which outlines their two-way or amplified communication system planned for office, factory, institutional and military use. Various models are illustrated, and a chart on the four basic Executone systems is provided to emphasize clearly their utility in industry.

Yarnall-Waring Company, Philadelphia, Pa., has published revised editions of three descriptive bulletins: Bulletin G-1306 is a 12-page condensed catalog of the complete Yarway line of Steam Plant Equipment; Bulletin T-1738 has a few changes on Impulse Steam Traps; and Bulletin EI-1909 is a revised 15-page catalog covering Yarway Expansion Joints.

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Tube Turns, Inc., Louisville, Ky., has recently published its fall issue of "Sparks," the house organ of the company, which is dedicated to telling the success story of welding in the shipbuilding industry. This issue carries a double-page spread showing how welding was recently employed to graft a new bow on a torpedoed destroyer, and it also features a collection of silhouettes of 24 ship pictures showing Uncle Sam's maritime strength. By charts and pictures, "Sparks" shows how the company's welding fittings are enabling shipbuilders to speed up the enormous job of pipe installations and save weight and space.

• • •

A catalog from Drayer-Hanson, Los Angeles, manufacturers of heat exchange equipment, illustrates their "Wat-R-Miser" as now equipped with air filter. Years of experience have proved that clean filtered and clean water are most vital factors in trouble-free evaporative condenser performance. Details of advantages, applications, capacities and specifications are covered in the publication.

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Marine Service Handbook is a new illustrated 18-page booklet published by the Marine Division of the Magnus Chemical Company, Inc., Garwood, New Jersey, manufacturers of cleaning materials and industrial soaps. This booklet is concerned with the treatment of feed water, control of sludge in fuel oil systems, and cleaning marine power equipment.

BOOK REVIEW

Salvage Manual for Industry

This manual, edited by seven engineers and published by Technical Service Section, Industrial Salvage Branch, Salvage Division, WPB, is paper-bound, 6 in. x 9 in, 250 pages, and is priced at 50c per copy. It can be procured through the Superintendent of Documents, Government Printing Office, Washington, D. C.

It contains 26 chapters, grouped into six major sections. There are 2 chapters on organizing and planning the salvage department; 3 on the administrative factors; 12 on methods of handling (finding, identifying, segregating, collecting, reclaiming, storing, selling, etc.) metal scrap; 3 on non-metallic waste; 7 case histories demonstrating exemplary practice; a 17-page compilation of practical hints for handling specific waste materials; and a 9-page index.

The well-illustrated volume was prepared and edited by an editorial board of practical industrial salvage engineers and business paper editors comprising the following: Editors, Robinson D. Bullard of The Bullard Company, and Fred P. Peters of "Metals and Alloys"; associate editors, H. E. Blank, Jr., of "Modern Industry," Arthur M. Perrin of National Conveyors Company, E. J. Tangerman of McGraw-Hill Publishing Company, and R. A. Wheeler of The International Nickel Company, Inc.; managing editor, John O. Emerson of the Industrial Salvage Branch, WPB. Assisting the editors either with direct contributions or advice was a corps of some 40 engineering or salvage experts. No effort has been spared to cover every possible phase of practical industrial salvage operations and to present the most reliable and authoritative information about them.

Running LIGHTS

Who When Where

Edited by B. H. Boynton

At the speakers' table, left to right: O. B. Whittaker, Lieutenant Governor Frederick F. Houser, President Fred L. Doelker, Arthur M. Tode, speaking Rear Admiral Howard L. Vickery, and Hugh Gallagher.

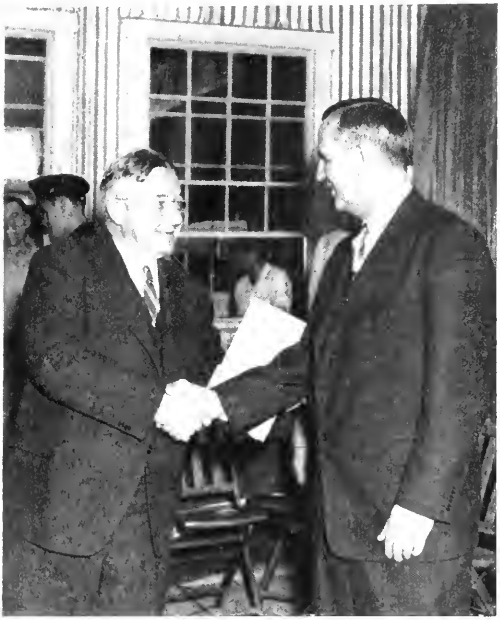
S. F. Propellers Honored

A surprise visit by Rear Admiral Howard L. Vickery, vice-chairman of the U. S. Maritime Commission, high lighted the first meeting of the new year on January 26, of the Propeller Club of the United States, Port of San Francisco.

The meeting was honored by several noted executives including The Honorable Frederick F. Houser, Lieutenant Governor of California; Arthur M. Tode, Honorary President of the Propeller Club of the United States; and O. B. Whittaker, president of the Propeller Club of the United States, Port of New York, who is manager of Federal & Marine Sales of the Sperry Gyroscope Company.

Rear Admiral Vickery commended the Pacific Coast shipbuilders for outstanding performance during 1943. He pointed out that "we will have to be terribly stupid before any setbacks in this war can be blamed on a lack of shipping facilities. The shipbuilders have done, and are doing, a marvelous piece of work."

Mr. Tode, who recently granted charters to several new Ports of the Propeller Club, declared that the need for such an organization is made quite evident by the fact that a new unit has been formed on an average of each six and a half weeks throughout the past ten years.



Allen D. Maclean, Assistant Director, Production Division, U. S. Maritime Commission, congratulates Wm. P. McGervey, Jr., vice president, Warman Steel Casting Co., Los Angeles, on winning the Maritime "M" Flag in recognition of Warman's production achievements in supplying castings for Victory and Liberty ships.

Members of House Committee Port of San Francisco

Fred L. Doelker, president of the Propeller Club of the United States, Port of San Francisco, has selected his House Committee for the 1944 club year. He has appointed Carroll Reeves as general chairman, with Byron O. Pickard, associate general chairman and Eugene F. Hoffman, secretary.

The sub-committees are divided into three groups: Arrangement and Attendance—R. deGorog, vice chairman; Joseph J. Robinson, D. N. Lillevand, Capt. Henry Blackstone, Robert D. Spear, and H. H. Pierson; Reception—Earl V. Livingston, vice chairman, Bernard N. De Rochie, Clyde Williamson, Harlan Scott, Raymond F. Burley, Edward J. Schneider, and William H. Stevens; Program—Raymond Hasenauer, vice chairman; Edward C. Mausshardt, John T. Greany, Capt. Andrew Townsend, John Davidson, John P. McArthur, and B. H. Parkinson.

Commissioner John H. Carmody, one of the five members of the United States Maritime Commission, discusses mutual problems with President K. K. Bechtel of Marinship while on a tour of the Sausalito tanker yard. Also shown are (standing) Marinship executives R. W. Adams, Robert Digges, R. L. Hamilton, Donald Maxson, Jack Hardie; Ward Freeman of the USMC; Marinship's Bruce Vernon, Walter Haluk, E. B. Fox, F. W. Boole and John Anderton. Seated are General Manager W. E. Waste and George Gorthorne of Marinship, Commissioner Carmody, Mr. Bechtel, USMC Regional Director Carl Flesher, and J. A. McKeown of the USMC Regional Office. *(This photograph through the courtesy of Marinship Corp.)*

"Who Goes There!"

Volunteer Port Security Force

Over 1300 San Francisco men and women are unselfishly giving 12 hours of their time every week as an aid to relieving regular Coast Guard members for active duty. This organization began on June 7, 1943, under the guidance of Captain A. C. Marts, U. S. Coast Guard, who formed the San Francisco Regiment, Volunteer Port Security Force.

Soon after recruiting started, Colonel Roy C. Ward, Officers Reserve Corps, U. S. Army, was appointed to command the regiment and was awarded the rank of Commander in the U. S. Coast Guard Reserve, Temporary. Lieutenant Commander Harry L. Evans was appointed executive officer, and Mrs. Raymonde Theill was appointed to head the women's division with the rank of Lieutenant (j.g.).

The regiment, which seeks a total membership of 2500 men and 250 women, is recruiting volunteers be-

Vigilance is shown here by Edgar T. Zaak, Seaman 1 c on duty as guard at the waterfront 12 hours per week, who in civilian life is a practising attorney.

San Francisco business men learn the art of self defense. Here Adolph P. Schman, Seaman 1 c, assistant Judo Instructor with the Port Security Force, is in civilian life a dress manufacturer. He is demonstrating how an unarmed guardsman can defend himself.

tween the ages of 25 and 65, physically capable of semi-military duty. Commander Ward is urging volunteers to apply at the second floor recruiting office, 244 California Street, San Francisco.

Each male recruit, before being assigned to duty, is chooled in self-defense and the proper use of firearms, as well as patrol drill and port security regulations. The women are trained to take care of the myriad clerical and stenographic details necessary in conducting such a large and important project.

Although the members of this volunteer regiment serve on a part-time basis and without pay, they are furnished with a uniform, including shirts and shoes, and all equipment necessary to the job, and are, while on duty and in uniform, entitled to all the privileges and authority of the Coast Guard of the United States as well as subject to its regulations and discipline.

On the Calship launching platform just before the S. S. James A. Wilder was launched. Left to right, Howard Hartry; Mrs. Howard Hartry, matron of honor; Mrs. Edward H. Harms, sponsor, and Edward H. Harms, assistant Pacific Coast director for the War Shipping Board. The vessel was the 315th launched from Calship's Terminal Island ways.

Mrs. Ed Harms Sponsor of Cal-Ship Launching

Scout leaders from many cities o Southern California met at the Cali fornia Shipbuilding Corporation yard at Terminal Island, January 14, to watch the launching of the Liberty ship S. S. James A. Wilder.

The vessel was named in honor o James Austin Wilder, originator o the Sea Scout program. He wa known as Pine Tree Jim because o his skill in developing for older boy a system of camping on a patro basis. His other accomplishment consist of writing, painting, and music. In 1930 the National Council Boys Scouts of America, conferred upon him the Silver Buffalo award for distinguished service to boyhood.

Lovely Mrs. Edward H Harms wife of E. H. Harms, assistant Pa cific Coast director for the War Ship ping Board, christened the ship, Cal ship's 315th vessel. As her matron of honor Mrs. Harms had Mrs. How ard Hartry of San Pedro.

Nordberg Service Engineers

Nordberg installation and service engineers for diesel engines are now located on the Atlantic, Pacific and Gulf Coasts, in addition to factory representatives available from Milwaukee.

One of the most recent arrivals in San Francisco Marine circles is Ernest L. Church, who has taken over as Pacific Coast service representative for the Nordberg Manufacturing Company.
Mr. Church, who has been with Nordberg for the past eight years, has established himself in the Sharon Building, 55 New Montgomery Street. He came to San Francisco from Florida. In the above photo the new San Franciscan meets his first copy of Pacific Marine Review.

Recent appointments providing more prompt service to the rapidly increasing number of diesel engines are as follows:

Ben A. Wilson at New York office, who will take care of diesel work on the Atlantic Coast.

George H. Lienhard, Beaumont. Texas, for the Gulf Coast.

Ernest L. Church, San Francisco, for the Pacific Coast.

New Officers of Mariners Club

The Mariners Club of California is under way in the new year under the pilotage of new officers, elected as follows: Frank De Pue, president: Thomas A. Short, vice-president: Captain William Foster, George E. Swett, Edward McCarthy and F. C. Archbold, governors.

These officers were elected at the annual business meeting Wednesday noon at the El Jardin Restaurant in San Francisco on January 12, 1944. Following the election the members had an "old-time get together."

Top: Frank De Pue re-elected President of the Mariners Club of San Francisco.
Bottom: Thomas A. Short, new Vice-President.

Carl W. Flesher, director, regional office Maritime Commission, Oakland, Calif., presenting Merit Badge to Sam Triolo, oldest employee of Los Angeles Steel Casting Co.

L. A. STEEL CASTING FIRM WINS "M" AWARD

Exceptionally colorful ceremonies conducted by a galaxy of Federal, naval and civic officials, marked the presentation of the Maritime "M" pennant and Victory fleet flag to the 650 men and women employees of the Los Angeles Steel Casting Co. Friday afternoon, January 14.

Presentation of the pennant and flag was made by Commissioner John M. Carmody of the U. S. Maritime Commission. The award was accepted on behalf of the management by C. B Tibbetts, executive vice president of the company, and member of the War Manpower Commission.

Carl W. Flesher, director of the regional office of the Maritime Commission at Oakland, California, presented the Merit Badges, which were accepted for all the employees by Sam Triolo, a steel molder, the oldest employee of the firm, having been with the company for over 31 years

Addresses were made by Admiral J. R. Defrees, Inspector of Naval Material, Los Angeles district, and by W. B. McKesson, Deputy County Counsel who substituted for the Hon. John Anson Ford.

The Los Angeles Steel Casting Company is the oldest foundry in the Los Angeles area. It has produced thousands of valves and fittings for the Maritime Commission and the U. S. Navy, its products going to practically every shipyard in the United States. The first Maritime Commission contract was awarded to the company in September, 1941, and the company was in full swing on war production two months before Pearl Harbor.

Left to right: C. W. Froome, Lieutenant Commander, U.S.N.R.; H. C. Chamberlain, President, Los Angeles Steel Casting Co.; B. M. Burchfield, Commander, U.S.N.R.; J. C. Arnold, Commander, U.S.N. (Ret.), Senior Assistant Inspector of Naval Materials, Los Angeles District; Carl W. Flesher, Director, Regional Office, Maritime Commission; J. R. Defrees, Rear Admiral, U.S.N. (Ret), Inspector of Naval Materials, Los Angeles District; John M. Carmody, Commissioner, United States Maritime Commission; C. B. Tibbetts, Executive Vice President, Los Angeles Steel Casting Co.

Leslie J. Haefner, new director.

WSA New Director of War Insurance

Appointment of Leslie J. Haefner of San Francisco as director of its division of wartime insurance was announced by the War Shipping Administration. He succeeds Percy Chubb, who is now assistant deputy administrator for fiscal affairs of WSA.

Mr. Haefner, who has been assistant director of the division of wartime insurance, has been with WSA since the summer of 1942. Before that he was for years a leader in marine insurance circles on the Pacific Coast and formerly marine secretary of the Fireman's Fund Insurance Company of San Francisco.

L. A. Propeller Club January Luncheon

The first luncheon meeting of the New Year was held at the Pacific Coast Club (Tudor Room), Long Beach, California, on January 19, at 12 noon.

The club members had a real treat, through the courtesy of Edgar W. Wilson, past president and present director of the Los Angeles-Long Beach chapter when he presented as guest speaker George J. McCarthy, former Oriental Passenger Traffic Manager of the American President Lines in Manila. He was interned by the Japanese at the time Manila was invaded and was recently repatriated to the United States on the Gripsholm. His experiences were intensely interesting to all the members.

Mrs. Edw. Schneider Sponsors S. S. Flying Mist

Mrs. Edward Schneider, wife of the estimator of the Moore Dry Dock Company and descendant of the prominent San Francisco pioneer Sbarboro family on January 25, sponsored the S. S. Flying Mist, a C-2 cargo ship, at Moore shipyards.

Maxim Silencer Adds Star to Pennant

In a letter dated December 9, from Admiral C. C. Bloch, U. S. N. (Retired), Chairman of the Navy Board for Production Awards, The Maxim Silencer Company of Hartford, Connecticut, was notified of a renewal of the Army-Navy "E" award originally presented last spring.

Employees drew praise on their splendid production record and for the evident fact that management and employees have indicated their solid determination and ability to support their fighting forces by supplying the equipment necessary for ultimate victory.

On October 29, the company received another award, this from the Treasury Department, when the firm was authorized to add the Treasury "T" and the Star to their Minute Man Flag. This award was made "for distinguished service of Maxim employees in recognition of their attainment of the cash quota for the purchase of War Bonds through the Payroll Deduction Plan."

At the signal, Mrs. Edward Schneider christened the S. S. Flying Mist, while Joseph A. Moore, Sr., proudly watches. The launching took place at Moore Dry Dock Co., Oakland, California.

WHO'S WHO afloat and ashore

A Landlubber Invented It!

Seagoing stewards, cooks and chefs will gnash their teeth on this one.

A landlubber, in the person of an army man, has found a successful method of making bread with sea water. Imagine!

The story came out of Chicago and is told by Colonel Tohland A. Isker, director of the Quartermaster Corps, Subsistence Research and Development Laboratory. He said a formula for using sea water in the making of bread involves only two steps not in the regular method.

The water is strained through a cloth to remove solid impurities and is treated with a small amount of calcium hypochlorite. With this exception, the bread is made in the conventional manner, with the period of fermentation increased from thirty minutes to two and one-half hours. No salt is added to the bread and the finished product is as good as any baker's loaf.

Third Indictment Dismissed

A third indictment against the tugboat May was recently dismissed by Federal Judge Claude McCulloch, in the District Court of Portland, Oregon. This vessel capsized in February, 1943, with the loss of nine lives. The Court, in returning the decision, ruled that the State had exclusive jurisdiction.

The indictment charged its owners, the Russell Tugboat and Moorage Company, with misconduct, negligence and violation of the law in connection with the mishap when the boat capsized, it was ferrying war plant workers across the Columbia River.

Western Sea Frontier Naval Chief

Rear Admiral David W. Bagley of Raleigh, North Carolina, became commander of the Western Sea Frontier, with the rank of Vice Admiral on February 1, with headquarters in San Francisco. This appointment was upon the nomination by President Roosevelt when he recommended **Vice Admiral John W. Greenslade** to be placed on the retired list with the rank of Vice Admiral.

Before his retirement, Vice Admiral Greenslade was also commandant of the Twelfth Naval District, headquarters of which is in San Francisco, and this post was succeeded by **Rear Admiral Carleton H. Wright,** who reported to duty direct from a sea command.

Rear Admiral Bagley's post as commandant of the Eleventh Naval District was succeeded by **Rear Admiral Wilhelm L. Friedell,** who was formerly commandant at Mare Island Navy Yard. The Navy Yard post was assigned to **Rear Admiral Mahlon S. Tisdale,** who also came shoreside from a sea command.

Appointment of Golden Gate Pilots

The San Francisco Bay Pilots have added to their league the following according to announcement by the California State Pilot Association: **Captain A. E. Petersen,** formerly of the Isthmian Steamship Company and the Shipowners (Red Stack) & Merchants Tugboat Co.; **Captain H. S. Stengel,** formerly with Standard Oil Company of California; **Captain H. L. Dahllof,** formerly with the Union Oil Company.

Naval Affairs Group Visits Hunter's Point

The Naval Affairs Committee of the San Francisco Chamber of Commerce with representatives from the San Mateo, San Jose, and Vallejo chambers of commerce, recently visited Hunter's Point for an inspection tour of Navy facilities there, arranged by courtesy of Captain N. L. Rawlings, U. S. N., Officer in Charge and General Manager.

Included in the group which visited Hunter's Point were: The Committee: E. J. McClanahan (chairman), Standard Oil Company of California: Oscar J. Beyfus. Ship & Oil Broker (presently attached to United States Navy in a civilian capacity); Leland W. Cutler, Fidelity & Deposit Company of Maryland; Marshall Dill; Chalmers Graham; A. J. Dickie, Pacific Marine Review; Edward C. Lipman, The Emporium; S. R. Newman, United Air Lines.

Delegates: Herbert Bowerman, San Mateo Chamer of Commerce, delegate on Bay Area Naval Affairs Committee; Noa Gayle, Vice-President, First National Bank of San Jose; Fred J. Oehler, Vice-President & Manager, American Trust Company, San Jose; Charles N. Bessac, President, Vallejo Chamber of Commerce and Vice-President, Mechanics & Merchants National Bank, Vallejo; Guy R. Kennedy, Executive-Manager, Vallejo Chamber of Commerce; Luther Gibson, Chairman, Naval Affairs Committee, Vallejo Chamber of Commerce; Craig Howard, Vallejo Chamber of Commerce, Washington representative.

On Tour of the Moore Dry Dock Co., Oakland. Joseph A. Moore, Sr., chairman of the board; Rear Admiral Howard L. Vickery, with Joseph A. Moore, Jr., president of Moore's, and Carl W. Flesher, regional director of the U. S. Maritime Commission.

Guests to the Northwest's Propeller Clubs

Rear Admiral Howard L. Vickery, vice-chairman of the U. S. Maritime Commission, was guest of honor at a dinner given by the Portland Propeller Club on January 21. Alex D. Stewart, secretary-treasurer of the Propeller Club of Seattle, attended.

O. B. Whittaker, president of the Propeller Club of the United States, Port of New York, was the guest of honor of the board of governors of the Seattle Propeller Club, January 17, at a luncheon held at the College Club in Seattle.

Plans for the Post War Trade

Return of the Johnson Line to the Pacific Coast trade is promised as soon as hostilities in Europe are over.

Officials of W. R. Grace & Co., general agents for the Pacific Coast quote President Axel Johnson as saying that his crack Swedish motorships, a fast combination passenger and freight carrier of the motorship Nordsjernan type, so familiar to this country before the war flying their blue and gold flag, will start the run out of Stockholm for United States West Coast ports as soon as practical.

These popular vessels, with an overall length of 440 feet, 55.9 beam, a deadweight capacity of 7060 tons, and a speed of more than 15 knots, will be a dominant factor in the European-Pacific Coast trade when peace comes

Merchant Marine Institute Elects

Frank J. Taylor, president of the American Merchant Marine Institute, Inc., since 1938, was re-elected at the annual meeting of the Institute, February 1, 1944. R. J. Baker, secretary - treasurer, and John J. Burns, general counsel, were also re-elected.

All members of the board of directors were re-elected for another year. The board consists of: R. R. Adams, executive vice president, Grace Line, Inc.; John F. Gehan, vice president, American Export Lines, Inc.; Ralph C. Goodwin, vice president, Mystic Steamship Division; J. J. Halloran, vice president and general manager, Coastwise Transportation Corporation; Basil Harris, president, United States Lines Company; B. B. Howard, general manager, Standard Oil Company of New Jersey; W. F. Jones, general manager, Gulf Oil Corporation; Charles Kurz, president, Pennsylvania Shipping Co.; Joseph T. Lykes, executive vice president, Lykes Bros. Steamship Co., Inc.; John McAuliffe, president Isthmian Steamship Company; A. V. Moore, president, Moore-McCormack Lines, Inc.; Lewis D. Parmelee, executive vice president, New York and Cuba Mail Steamship Company; H. Harris Robson, vice president, United Fruit Company; H. W. Warley, president, Ore and Calmar Steamship Corporations.

Alexander M. Garland Passes

The passing of Alexander M. (A. M.) Garland at the age of 81, late in December, ended the career of another steamship executive who played a major role in trans-Pacific shipping a half century ago. He was general manager of the old China Mail Steamship Company until the firm firm went out of business and he was recognized as one of the foremost marine executives in Oriental shipping.

As head of the company when they operated the old liners, the China and the Nanking, and for a while, the S. S. Nile, which was under British registry, he shared in the colorful era of shipping.

His home is in Alameda where he had lived in retirement for many years with his wife, and their two daughters, Marjorie June and Alexine Mary Garland.

From Yacht to Freighter

The former luxury yacht Mariner, once the property of the late John Barrymore, noted actor, is being converted into a freighter for the Southern California and West Coast of Mexico freight service.

Purchased by Alfred A. Brown, of Ensenada, Mexico, at private terms, the craft originally cost $170,000, and still holds the sailing yacht record from Hawaii to the mainland of 11 days and 16 hours.

A Hero Marries!

Captain James Swett, 23, son of George E. Swett, hero of numerous Jap engagements, wearer of the Congressional Medal of Honor, ranking ace of the Pacific, was married January 24, in San Mateo, California, to Lois Anderson of Oakland. The bride was an employee of George E. Swett & Co., well-known marine representative for a number of large eastern marine accessory concerns.

One of the five Commissioners of the United States Maritime Commission, John H. Carmody, is caught by our staff photographer while asking questions during a recent tour of Marinship Tanker yard.

Above: Mrs. Arthur Tode about to christen the S. S. Nathan S. Davis with Mr. Tode, honorary national president of the Propeller Club of the United States, proudly watching.

"First Mate" of Propeller Club Skipper Is Sponsor

Below: Liberty ship named in honor of the "father" of American Medical Association was launched by the Permanente Metals Corp. Richmond Shipyard No. 2. The sponsor's party included Captain McClure, Mrs. Arthur Tode, the sponsor, Mrs. Tode Mrs. Stoddard, Matron of Honor, Chaplain Cerf Straus and Mrs. Vivian, flower girl.

Standardized speed reduction units.

Speed Reduction Units Standardized

A line of standardized, completely self-contained industrial speed reduction units suitable for turbine application has been announced by the Cone-Drive Division of the Michigan Tool Company, Detroit, Michigan.

The line has been developed from the naval turbine reduction units produced by the Cone-Drive Division for the U. S. Navy in large numbers in recent years. Built around the use of area-contact, double enveloping Cone-Drive gearing, these units are inherently more compact than would be possible with other forms of right-angle-drive gearing of equal load capacity.

The new Cone-Drive standard industrial turbine reduction units are being made available at this time in 26½- and 37-horsepower base ratings. The former is the output of a 4½-in. Cone-Drive center distance unit, while the larger unit has Cone-Drive gears of only 6-in. center distance. Both types are designed to operate on input speeds of 5000 to 6000 rpm. The two basic units are available in a selection of standard ratios ranging from 3½ to 8 to one.

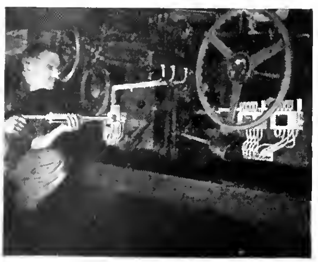
Self-contained, they are completely equipped with built-in oil pump and oil cooler, oil filter and pressure relief valve, pressure gage, thermometer, and oil level gage. The lubrication system is of the force feed type.

"Multival" System

Positive lubrication of all bearings on machine tools and similar equipment, regardless of location or condition of bearings, can be had through the improved "Multival" system made by the Farval Corporation, Cleveland. Oil or grease under pressure is delivered to the distributing blocks by means of a manual or power-operated portable gun which serves as a central pump.

Complete multival equipment consists of the multiple valve blocks, each serving 2 to 10 bearings, lubricant lines leading to individual points, and suitable fittings to accommodate practically any type of bearing connection. The systems can be readily installed by shop maintenance crews.

Experience shows that the system will reduce labor of oiling, eliminate waste of lubricant, increase production, reduce repairs and maintenance and prolong the life of tool equipment.



Above: The "Multival" system.

Right: Magnetic chuck.

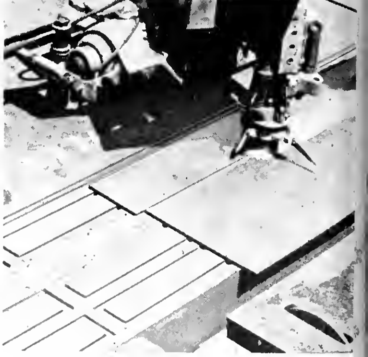
Magnetic Chucks Save Man-Hours

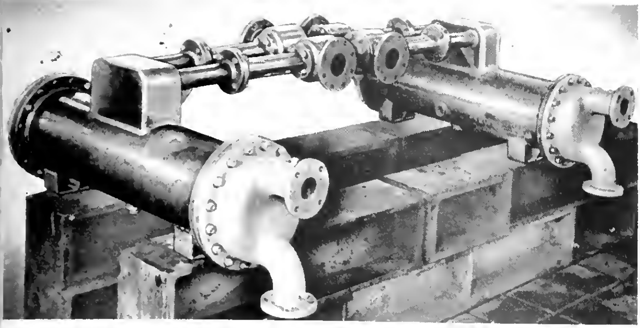
The illustration shows H & H magnetic chucks holding ship plates for welding with the Union Weld Machine at the California Shipbuilding Corporation Yards, Terminal Island, California.

One hundred man-hours per eight hour shift are being saved through the use of one six-chuck unit, it is reported, with a welded footage output of 600 to 800 ft. per shift on flat work. Use of the chucks eliminates saddles and their subsequent removal, makes accurate spacing a fast operation, and results in other definite advantages.

This particular set-up consists of three pairs of magnetic chucks, each chuck 18″ wide by 5′ long, placed end to end with a longitudinal gutter of about 2½″, which arrangement permits a 15′ continuous weld. A square copper tube, attached to the faces of the chucks, occupies the gutter. This tube provides effective heat dissipation and a smooth uniform contact at the backs of the plates, prevents leak-through and magnetic flux interference, and assures a good clean bead. The magnetic pull of the chucks is so powerful that wavy plates are straightened out at the edges. Magnetic chucks, however, can be used for easy contour as well as flat surfaces.

These chucks are manufactured by the Plastiform Manufacturing Company, Los Angeles 26, Calif.





Mexican Gunboat Repairs

Recently the South Coast Company of Newport Beach completed extensive repairs and overhaul on ten Mexican gunboats under a lend-lease arrangement. These vessels had been built in Spain to British specifications, powered with engines built in Germany and equipped with French naval guns.

The South Coast Company probably learned a lot about foreign standards in relation to American commercial standards.

Elliott Ejectors for Kaiser

These specially designed air ejectors are being turned out by the score at Elliott Company, Jeannette, Pa., for use on corvettes being built for the U. S. Maritime Commission by Kaiser Cargo, Inc., West Coast shipbuilders.

The installations consist of twin single-stage ejectors which exhaust into an after-condenser. Two ejector units are required by each vessel, one right-hand and one left-hand type completing each pair.

The ejectors serve the condensers of the two engines which drive each vessel.

A Safety Seal for Protection

A new and low-priced device to provide protection against fire sabotage is now available from The General Detroit Corporation, manufacturers of fire-fighting equipment. Known as the General Safety Seal, it is designed to prevent fire extinguisher tampering or clogging, and is offered in models to fit all standard types of extinguishers.

Constructed of heavy water-repellent stock, the seal has three standard types of design. Foam and soda acid extinguishers are protected by a stitched envelope which slips snugly over the hose and fastens around the control valve. Vaporizing liquid extinguishers are fitted with two caps, one covering the pump end and the other protecting the nozzle. Carbon dioxide extinguishers are guarded by a cup-type envelope which fastens tightly over the nozzle horn. All protective envelopes or caps are securely held in place by a tamper-proof wired seal. The envelope cannot be removed or the extinguisher used without breaking the seal. Thus the extinguisher cannot be tampered with or become clogged without warning, and the danger of explosion is reduced.

Published monthly with alternate listings of yards in two sections: Pacific Coast, one month; Atlantic, Lakes and Rivers, the following. Send information to Directory Editor, 500 Sansome Street, San Francisco.

American Shipyard[s]

DIRECTORY of EXECUTIVE[S]

Atlantic, Lakes, Rivers

ALABAMA DRY DOCK & SHIPBUILDING CO.
Mobile, Ala.
President: D. R. Dunlap.
Vice Pres. and Sec. Treas.: G. H. Dunlap.
Vice Pres. and Gen. Mgr. Shipbuilding Division: F. B. Spencer.
Vice Pres. in Charge of Operations: J. M. Griser.
Vice Pres. and Asst. Sec. Treas.: B. F. Campbell.
Comptroller: J. R. Jones.
Naval Architect: G. W. Szepinski.
Purchasing Agent: E. L. Merkel.

LESTER F. ALEXANDER CO.
New Orleans, La.
Partners: Lester F. Alexander and W. L. Wroten.

AMERICAN BRIDGE COMPANY
Frick Bldg.
Pittsburgh 19, Pa.
President: L. A. Paddock.
Treasurer and Sec.: H. P. Anderson.
Contracting Mgr.: W. B. Guernsey.
Purchasing Agt.: D. Hammerschmidt.

AMERICAN BOATBUILDING CORP.
Miami, Florida

AMERICAN CAR & FOUNDRY CO.
Wilmington, Delaware

THE AMERICAN MACHINERY CORP.
Orlando, Florida

THE AMERICAN SHIP BUILDING CO.
1410 Terminal Tower
Cleveland 13, Ohio
President: W. H. Gerhauser.
V. Pres. & Gen. Mgr.: R. P. Schlabach.
Manager of Sales: J. L. Wallace.
Naval Architect: Kent C. Thornton.
General Supt.: John E. Steinman.

ARLINGTON SHIPBUILDING & ENGINEERING CORP.
P. O. Box 1410
Jacksonville, Florida
President: L. Germain, Jr.
Vice Pres. & Mgr.: R. R. Perner.
Chief Engineer: E. L. Bouchelle.
Purchasing Agent: L. Germain III.

ATLANTIC, GULF & PACIFIC COMPANY
New York, N. Y.

AVONDALE MARINE WAYS
Westwago, Louisiana

BALTIMORE SHIP REPAIR CO., INC.
Baltimore, Md.
President: Henry Kolb.
Vice-President: John Sumke, Sr.
Sec. & Treas.: H. J. Moylan.
Plant Superintendent: John Sumke, Sr.
Purchasing Agent: H. J. Moylan.
Chief Engineer: Elroy Waters.

BALTZER-JONESPORT BOAT CORP.
Medford, Mass.
Pres. and Mgr. and Naval Architect: Charles F. Baltzer.
Purchasing Agent: Dorotha Nolan.
Chief Engineer: Geo. J. Addington.

BAPTISTE SEAGOING CRUISER CO.
Foot of Emmons Ave., Sheepshead Bay, Brooklyn, N. Y.

BARBOUR METAL BOAT WORKS
Valley Park, Mo.
President: Chas. M. Barbour.
Vice President: R. F. Hildebrant.
Manager: C. M. Barbour.
Chief Engineer: H. C. Holz.

BARKER BARGE LINE, ALEX.
Lockport, La.
Owner: Alex. Barker.

BARNES-DULUTH SHIPBUILDING COMPANY
Duluth, Minn.
President: Julius H. Barnes.
Vice President: Arthur P. Barnes.
Yard Supt.: David H. Welsh, Sr.

BARNES, JULIUS H.
19 Rector Street
New York, N. Y.

BATH IRON WORKS
Box 327
Bath, Maine
President: W. S. Newell.
Vice Pres.—Executive: A. M. Main.
Vice Pres.—Finance: G. Vincent Pach.
Vice Pres.—Procurement: R. F. Hill.
General Manager: G. B. Connard.
Treasurer: S. L. Eaton.
Naval Architect: E. E. Pierce.
Chief Engineer: S. H. Towne.
Electrical Engineer: H. B. Briggs.
Consulting Engr.: H. O. Trowbridge.
Supt. Hull Const.: Arthur W. King.
Machinery Supt.: E. P. Steininger.
Purchasing Agent: W. D. Hill.

BAY CITY BOATS, INC.
Bay City, Mich.
Operate in Defoe Shipbuilding C[o.] Yards
President-Manager-Purchasing Ager[nt]: F. W. Atkins.
Vice Pres.: F. W. Defoe.
Sec. & Treas.: H. J. Defoe.
Chief Engineer: L. C. Hume.
Superintendent: Louis Verellen.
Asst. Superintendent: Ancel Dixon.

BEDELL'S SHIPYARD
Ft. Broad Sratford
Bridgeport, Conn.

BEETLE COMPANY, CARL N.
70 Prospect Street
New Bedford, Mass.
Mgr. & Purch. Agt.: Carl N. Beetle.
Naval Architect: S. S. Crocker.
Superintendent: Frederick G. Towle
Foreman: Everett Clark.

BELFAST SHIPBUILDING CORP.
Belfast, Maine
President: J. P. Williams.
Manager: N. E. Jackson.
Purchasing Agent: L. A. Blake.

BELL-WALLACE COMPANY, INC., THI
Morehead City, N. C.
Pres.: Charles S. Wallace.
Sec.-Treas.: George R. Wallace.
Gen. Superintendent: A. E. Cannon.
Purchasing Agent: W. A. Mace.

BENDER WELDING & MACHINE CO.
P. O. Box 42
Mobile 1, Alabama
President: T. J. Bender.
Vice President: Thos. B. Bender.
Sec. and Treas.: J. J. McCafferty.
Chief Engineer: E. L. Bates.

BENSON BOAT CO.
Fort Lauderdale, Fla.

BERG BOAT COMPANY, INC.
Georgetown, Md.

BETHLEHEM-FAIRFIELD SHIPYARD, INCORPORATED
Fairfield, Baltimore, Md.
President: A. B. Homer.
Vice Pres. and Gen. Mgr.: J. M. Willi

BETHLEHEM STEEL COMPANY
Shipbuilding Division, General Office
25 Broadway, New York, N. Y.
President: E. G. Grace.
Vice Pres.: A. B. Homer, New Yor
Treas.: J. P. Bender, Bethlehem, Pa.
Purch. Agt.: C. R. Holton, Bethleher Pa.
Comptroller: F. R. Schick, Bethleher Pa.
Sec.: R. E. McMath, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, INC.
Shipbuilding Div.—Fore River Yard
Quincy, Mass.
General Manager: W. H. Collins.
Technical Mgr.: John E. Burkhardt.
Naval Architect: James B. Hunter.
Asst. Mgr., Eng'ring: Benjamin Fox.

BETHLEHEM STEEL COMPANY
Shipbuilding Division, Boston Yards, East Boston, Mass.
Yard Manager: T. S. Andrews.

BETHLEHEM STEEL COMPANY
Shipbuilding Div.—Staten Island Yard
Staten Island, N. Y.
General Manager: George H. Bates.

BETHLEHEM STEEL COMPANY
Leetsdale, Pa.
(Fabricated Steel Construction Div.)
Gen. Mgrs.: E. J. Paulus, C. M. Denise.
Purch Agent: C. R. Holton.

BETHLEHEM-HINGHAM SHIPYARD, INC.
Hingham, Mass.
President: A. B. Homer.
Vice Pres. & Gen. Mgr.: W. H. Collins.

BETHLEHEM-SPARROWS POINT SHIPYARD, INC.
Sparrows Point, Md.
President: Eugene G. Grace.
Vice Pres.: A. B. Homer.
General Manager: S. J. Cort.
Manager: F. A. Hodge.

BIGELOW, A. & CO.
Monument Beach, Mass.

F. M. BINDLOSS MARINE RWY.
31 Water St.
Mystic, Conn.

ARTHUR G. BLAIR, INC.
149 Alexander Street
Yonkers 2, N. Y.
Chairman of the Board: Col. James H. Hayes.
President: Arthur G. Blair.
Gen. Manager: Wm. T. Wilson.
Asst. to the Pres.: Frederick Gade.
Vice Pres. and Treasurer: Rowland A. Robbins.
Secretary: Henry B. Wesselman.
Purchasing Agent: S. F. Johnson.

BLUDWORTH SHIPYARDS
Houston, Texas
President: S. L. Bludworth.

BOAT CRAFT COMPANY
15 Hubbard Street
Brooklyn, N. Y.

BOOZ BROS.
Baltimore, Md.
President: William B. Booz.
Vice President: E. W. Bartholow.
Treasurer: William B. Booz.
Secretary: E. W. Bartholow.

BOSTON MARINE CO.
2 New Street
Boston, Mass.

BOYCE MACHINE CO.
Brown's Wharf
Portland, Maine
President-Manager: Fred F. Boyce.

BREWER DRY DOCK CO.
Mariners Harbor, S. I., N. Y.
President: Arthur J. Grymes, Jr.
Vice President: G. F. Fisher.
Plant Superintendent: H. M. Thom.
Purchasing Agent: Richard Forman.

BROWN SHIPBUILDING COMPANY
P. O. Box 2634
Green's Bayau & Industrial Rd.
Houston, Texas
Partner: Herman Brown.
Partner: George R. Brown.
Gen. Manager: L. T. Bolin.
Works Mgr.: J. E. Walters.
Naval Architect: T. A. Haraldsen.
Chief Engineer and Asst. Works Mgr.: M. P. Anderson.
Purchasing Agent: A. J. Joyce.

BROWNSVILLE SHIPBUILDING CORP.
Brownsville, Texas
President: O. E. Stuart.
Vice President: Woods Christian.
Secretary: E. M. Bremer.
Plant Supt.: Gray I. Thomas.
Purchasing Agent: J. C. Swinburn.

BRUNSWICK MARINE CONSTRUCTION CORPORATION
Brunswick, Georgia
President: Egbert Moxham.
Vice Pres.: Egbert Moxham, Jr.
Treas.: Rex R. Thompson.
Secretary: A. G. Lampke.
Repair Dept. Mgr.: Walter Nathan.
Naval Architect: Egbert Moxham, Jr.
Chief Engineer: G. T. Sondeen.
Purchasing Agent: Paul Hyer.

BURNS MACHINE & SHIPBUILDING COMPANY
Jacksonville, Florida

BURGER BOAT CO.
Manitowoc, Wisconsin
President and Mgr.: Henry C. Burger.
Vice President: Mrs. Mamie Burger.
Naval Architect: Raymond Franz.
Chief Engineer: Walter Burger.
Yard Supt.: George Burger.
Purchasing Agent: Henry E. Burger.

IRA S. BUSHEY & SONS, INC.
Brooklyn, N. Y.
President: Francis S. Bushey.
Vice President: Ira S. Bushey.
Treas. and Sec.: Raymond J. Bushey.

WALTER BUTLER SHIPBUILDERS, INC.
Main Office: Minnesota Bldg., St. Paul, Minn.
Shipyard: Superior, Wisconsin
President: Robert Butler.
Vice Pres.: James R. Faricy.
Manager: G. A. Meyer.
Naval Architect: George G. Sharp.
Chief Engineer: Thomas F. Hackett.
Purchasing Agent: J. F. Nunenmacher.

CADDELL DRY DOCK & REPAIR CO., INC.
Foot of Broadway
West New Brighton
Staten Island, N. Y.
President: John B. Caddell.
Vice President: A. Caddell.
Treasurer: Leroy W. Caddell.
Manager: Samuel Dahl.
Chief Engineer: Adolph Kvinge.
Purchasing Agent: Raymond Caddell.

CAIRNEY ENGINE & BOILER WORKS, INC.
368 Front Street
Stapleton, Staten Island 4, N. Y.
Pres.-Purch. Agt.: Daniel G. Brennan.
Vice Pres: Helen Cairney.
Plant Eng.: Robert Werner.
Naval Architect: Robert Aasberg.
Manager: Daniel G. Brennan.
Purchasing Agent: Fredric B. Gilbert.

CALUMET SHIPYARD & DRY DOCK CO.
9367 Harbor Avenue
Chicago, Illinois
President and Mgr.: James A. Rogan.
Vice President: August Hausler.
Naval Architect: James A. Rogan.
Chief Engr. & Purch. Agent: James F. Rogan.

CAMBRIDGE MANUFACTURING CO.
Maryland Avenue
Cambridge, Mass.
President: J. Howard Philips.
Vice President: John G. Mills.

CAMBRIDGE SHIPBUILDERS, INC.
Cambridge, Maryland
President: George L. Broffe.
Vice President: Robert H. Matthews.
Treasurer: L. R. Dooley.
Secretary: Robert L. Levine.
Assistant to President and Director of Engineering: Gilbert W. Vickers.
General Manager: Geo. L. Broffe.
Purchasing Agent: Cecil G. Weber.
Superintendent: Glesner N. Brooks.
Asst. Superintendent: Paul L. Jones.

CAMDEN SHIPBUILDING & MARINE RAILWAY COMPANY
Box 100
Camden, Me.
President: Richard Lyman.
Vice President: Cary W. Bok.
Treasurer: Clinton A. Lunt.
Secretary: John E. Willey.
Comptroller: Charles J. South.
Public Relations Director: Cary W. Bok.
Purchasing Agent: O. W. Mayhew.
Asst. Purch. Agent: John Matthews.
Superintendent: John Gamage.
Asst. Supt.: William Warner.
Naval Architect: Geerd Hendel.
Production Manager: Clinton A. Lunt.
Director of Engineering and Chief Engineer: Robert McCown.

CAMPBELL BOAT COMPANY, THE
R. R. No. 1
Holland, Mich.
Manager and Naval Architect: Kenneth H. Campbell.

CAMPBELL BROTHERS
Jeffersonville, Indiana

CANULETTE SHIPBUILDING COMPANY
Slidell, Louisiana
President & Manager: F. N. Canulette.
Chief Naval Arch.: W. E. Canulette.
Chief Engineer: J. Panks, Jr.
Purchasing Agent: Mayo Canulette.
Technical Engineer: John D. McBride.

VICTOR CARLSON & SONS, INC.
2853-2855 Park Ave.
Minneapolis, Minnesota
President: Carl V. Carlson.
Chief Engr.: H. W. Albert.

CENTRAL SHIPBUILDING COMPANY
Chicago, Illinois

CHARLESTON S. B. & D. D. CO.
106 Concord St.
Charleston, South Carolina
Pres.: Leo W. Grothaus.
Vice Pres.: L. Louis Green, Jr.
Vice Pres. and Comptroller: W. H. Egolf.
Secretary-Treasurer: E. Hibbe.
Chief Engr.; W. F. Martin.
Plant Supt.: A. A. Gerken.

CHICAGO BRIDGE & IRON CO.
332 South Michigan Ave.
Chicago 4, Ill.
President: George T. Horton.
Exec. V. P.: Merle J. Trees.
Chief Engr.: O. A. Bailey.
Purch. Agent: F. E. Lee.
Chicago Plant
Plant Superintendent: E. K. Carlson.
Purchasing Agent: F. E. Lee.
Birmingham Plant
Manager: E. E. Michaels.
Greenville, Pa., Plant
Manager: W. S. Nesbitt.
Purchasing Agent: Geo. Beck.
Eureka (California) Dry Dock Yard
Yard Manager: D. E. Larson.
Morgan City (Louisiana) Dry Dock Yard
Yard Manager: I. E. Boberg.
Newburgh (New York) Dry Dock Yard
Yard Manager: I. L. Wissmiller.
Seneca (Illinois) Shipyard
Managing Director: C. S. Pillsbury.
General Manager: C. W. Hines.
Yard Manager: Donald E. Leach.
Superintendent: A. E. Ellerbee.

THE CITY LUMBER CO. of BRIDGEPORT, CONN.
Bridgeport, Conn.
President: Isaac E. Schine.
Vice President: Nathan H. Schine.
Mgr. & Chief Engr.: Charles P. Lamb.
Purchasing Agent: Dave Nevins.

COLONNA'S SHIPYARD, INC.
Norfolk, Virginia

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, N. Y.
President: Wm. G. Wood.
Vice President: F. McCaffery.
Secretary Treasurer: W. A. Roos, Jr.
Naval Architect: H. P. Fiske.
Chief Engineer: Wm. Young.
Purchasing Agent: A. F. Wizemann.

CONSOLIDATED STEEL CORPORATION, LTD., Shipbuilding Division
P. O. Box 481
Orange, Texas
President: A. G. Roach.
V. P. in Charge: Capt. Harry B. Hird.
V. P. in Charge of Administration and Finance: H. C. Cranfill.
Vice Pres. and Mgr.: C. F. Raleigh.
Production Manager: J. B. McClellan.
Purchasing Agt.: F. H. Roberts.
Chief Engineer: J. R. McChesney.

CONSOLIDATED STEEL CORPORATION OF TEXAS
P. O. Box 341
Orange, Texas
President: A. G. Roach.
Vice Pres.: Captain Harry B. Hird.
Vice Pres. and Mgr.: C. F. Raleigh.
Sec. and Treas.: H. C. Cranfill.
Production Manager: John Hammond.
Purch. Agent: C. H. Benckenstein.

CORNWALL SHIPBUILDING CO.
Cornwall Landing, New York
President: Milton A. Henry.
Mgr.: Edward J. Anthony.
Naval Arch.: Harry Keene.

CORPUS CHRISTI SHIPBUILDING CO.
Corpus Christi, Texas
Owners: J. Henry Nicks, A. D. Corgey
Manager, Naval Architect and Chief Engineer: Frank H. Anderson.
Purchasing Agent: R. O. Redmond.

CRAMP SHIPBUILDING COMPANY
Richmond and Norris Sts.
Philadelphia, Pa.
Chairman of the Board: J. P. Ripley.
President & Gen. Mgr.: H. E. Rossell.
Vice President: H. Birchard Taylor.
V. P. & Chief Engr.: Garland Fulton.
Secretary Treasurer: H. F. Mayer.
Controller & Asst. Sec'y: A. A. Ricker.
Yard Manager: A. J. Grassick.
Procurement Agent: John H. Smith.

CRISFIELD SHIPBUILDING CO.
Crisfield, Maryland

THE CURTIS PETHICK CO.
1 Hickory Street
Wilkes Barre, Pa.

DACHEL-CARTER SHIP BUILDING CORPORATION
Benton Harbor, Michigan
President & Mgr.: J. T. Schless.
Vice President: Peter Dachel.
Nav. Arch.: Wm. Abraham.
Chief Engineer: E. K. Snyder.
Comptroller: W. M. Hill.
Purchasing Agent: W. P. Smith.
Treasurer: L. A. Listug.
Secretary: H. S. Gray.

DADE DRY DOCK CO.
777 Biscayne Blvd.
Miami, Fla.
Pres.: Alex. M. Balfe.
Mgr.: Capt. John R. McGuire.
Naval Arch.: John A. Thompson.
Purch. Agent: Waldo Hilbom.

DANIELS BROTHERS
Fort Meyers, Fla.
Owners and Operators: Henry Daniels and Frank Daniels.

DARBY CORPORATION, THE
1st and Walker Ave.
Kansas City, Kan.
President: Harry Darby.
Vice Presidents: Leland W. Browne and George F. Williamson.

DARLING & SON MARINE RAILWAY, J. S.
Hampton, Va.
Officers: F. W. Darling & J. S. Darling.
Railway Manager: Clyde Smith.

DAUNTLESS SHIPYARDS, INC.
Essex, Conn.
Pres.-Gen. Mgr.: Robert E. Croft.
Treasurer: Earl H. Croft.

DAVIDSON, JAMES E. AND EDWARD C.
Bay City, Mich.
Officers: James E. and Edward C. Davidson.

DECATUR IRON & STEEL CO.
Decatur, Ala.
Pres.: Henry R. Davis.
Vice Pres.: C. A. Ballentine.
R. L. Stephenson.
Manager: R. T. Harris.
Chief Engr.: M. G. Ozier.
Purch. Agent: W. H. Tankersley.

DEFOE SHIPBUILDING CO.
Bay City, Mich.
President and Manager: H. J. Defoe.
Vice President: F. W. Defoe.
Asst. Manager: W. E. Whitehouse.
Naval Architect: L. E. Maples.
Chief Engineer: A. J. Maples.
Prod. Mgr.: Floyd Swansen.
Plant Superintendent: Albert Johnson.

DELTA SHIPBUILDING COMPANY, INC.
New Orleans, Louisiana
President: W. H. Gerhauser.
Vice Pres. & Treas.: R. B. Ackerman.
Vice Pres. in Charge of Operations: J. E. Steinman.
V. P. & Naval Arch.: E. B. Williams.
Comptroller: W. A. Rowe.
Manager of Materials: L. M. Farr.

DENSMORE CO., INC., J. M.
94 Densmore Street
Quincy, Mass.
President: Everett E. Weatherbee.
Treasurer: H. F. Hamilton.
Mgr. & Naval Arch.: J. M. Densmore.
Chief Engineer: E. F. Tomlinson.
Purch. Agt.: Everett E. Weatherbee.

DINGLE BOAT WORKS, JOSEPH
St. Paul, Minn.
President: George J. Towle.
Vice President: W. J. Towle, Jr.
Purchasing Agent: G. W. Towle.
Naval Architect and Chief Engineer: Erich S. Swenson.

DIXIE MACHINE WELDING & METAL WORKS
Annunciation and Poeyfarre Sts.
New Orleans, La.
Owner & Gen. Mgr.: Julius Szodomka.
Purchasing Agt.: J. Donaldson.
Asst. Purch. Agt.: Robert Ching.
Superintendent: W. Hudury.
Asst. Supt.: Joffre Mercier.
Production Manager: E. Ibele.

DIXIE SAND & GRAVEL CORP.
Hill and River Streets
Chattanooga, Tenn.
President: John A. Miller, New York.

DODGE BOAT & PLANE CORP.
Box 324
Newport News, Va.
President: Horace E. Dodge.
Vice Pres.: W. M. Horn.
Purch. Agent: Mr. Devine.
Factory Mgr.: H. F. Jorgensen.
Naval Architect and Chief Engineer: N. Lauterbach.

SHELBURNE HARBOR SHIPYARD
Burlington, Vermont
operated by
DONOVAN CONTRACTING CO.
Burlington, Vt.
Owner: Geo. Donovan.
Manager: J. F. Olson.

THE DRAVO CORPORATION
Engineering Works Division
Pittsburgh, Pa., and Wilmington, Del.
Chairman of Board: J. D. Berg.
President: V. B. Edwards.
Vice Presidents: J. S. Miller, Alex W. Dann, W. K. Fitch, Wm. H. Fowler, E. T. Gott, S. P. Felix, and R. W. Remp.
Manager: R. W. Marvin.
Naval Architect: A. J. Dawson.
Chief Engineer: A. J. Ackerman.
Purchasing Agent: A. Davia.

DUBUQUE BOAT & BOILER WORKS
Third Street Extension
Dubuque, Iowa
President & Gen. Mgr.: H. B. Miller.
Vice President: C. D. Ford
Mgr. & Purch. Agent: Arch F. Abing
Naval Arch. & Chf. Eng.: C. F. Elliott.
General Supt.: Clarence Mackert.

DUNN & ELLIOTT CO.
Thomaston, Me.
President: A. J. Elliott.
Vice President: J. E. Elliott.
Treasurer: A. B. Elliott.

DUNN MARINE RAILWAY CO.
Portsmouth, Va.

DUNPHY BOAT CORP.
Broad Street at Parkway
Oshkosh, Wis.
Pres. and Gen. Mgr.: James Larsen.
Vice Pres. and Purch. Agt.: V. Larsen.
Naval Architect: A. M. Deering.
Chief Engineer: John Meidl.

EAST COAST SHIPYARDS INC.
Ft. of East 21st Street
Bayonne, N. J.
New York Office, 11 Broadway
Pres. & Gen. Mgr.: John E. Otterson.
Treasurer: Walter W. Clark.
Secretary: A. H. Barclay, Jr.
Administrative Mgr.: W. M. Merrick.
Comptroller: M. J. Borst.
Public Relations: V. G. Savage.
Chief Buyer: A. Zimmerman.
Cashier: T. J. Durkin.
Personnel: J. I. McClain.
Repair Supt.: A. G. Hobson.

EASTERN SHORE INDUSTRIES, INC.
Cambridge, Maryland
President & Naval Architect: H. I. Chapelle.
V. P. & Purch. Agent: David Wroten.

EAU GALLIE YACHT BASIN
Eau Gallie, Fla.
President and Owner: P. D. Barbour.
Sec.-Treas.: Ellsworth Morgan.
General Manager: W. F. Jurgens.
Purchasing Agent: E. Morgan.
Chief Engineer: Wm. Hart.

ELECTRIC BOAT COMPANY
Groton, Conn.
President: Lawrence Y. Spear.
Exec. Vice Pres.: Henry R. Sutphen.
Vice Presidents: John J. Hopkins and O. P. Robinson.
Treasurer: H. G. Smith.
Secretary: Charles P. Hart.
PLANT DIRECTORY
(New London)
Vice Pres. & Gen. Mgr.: O. P. Robinson.
Asst. to Pres.: M. E. Serat.
Design Director: B. S. Bullard.
Chief Engineer: L. B. Doane.
Consulting Engineers: F. T. Cable and E. Nibbs.
Purch. Agent: F. B. Bentley.

ELECTRO DYNAMIC WORKS OF ELECTRO BOAT WORKS
Avenue A
Bayonne, N. J.
President: Lawrence Y. Spear.
Vice President: H. R. Sutphen.
Manager: M. E. Hall.
Chief Engineer: G. T. Smith.
Purch. Agent: Rodney F. Plimpton.

EMPIRE SHIPBUILDING & REPAIR CORP.
Newark, New Jersey

ESSEX BOAT WORKS, INC.
Ferry,
Saybrook, Conn.

ESSEX MARINE RWY. CORP.
Mack Street
Essex, Conn.
Pres.: W. M. Jenks.
Vice Pres.: H. Ross Perkins.
Manager: F. H. Koehler.
Purch. Agent: W. M. Jenks.

THE FEDERAL SHIPBUILDING AND DRY DOCK COMPANY
Kearny and Port Newark, N. J.
President: L. H. Korndorff.
Vice President and General Manager: W. C. Hemingway.
Works Manager: G. G. Holbrook.
Plant Engineer: Wm. C. Ohlssen.
General Supt.—Kearny: P. Burbage.
General Supt.—Port Newark: A. R. McMullen.
Newark, New Jersey, Office:
744 Broad Street
Vice President, Sales and Engineering: C. W. Bryan, Jr.
Acting Chief Engineer: A. S. Thaeler.
Naval Architect: C. Rasmussen.
Electrical Engineer: I. H. Osborne.
Purchasing Agent: R. S. Page.
Assistant Manager of Sales: C. F. Ebsen.

FIELD-MARTIN
Minneapolis, Minnesota

FLORIDA INLAND WATERWAYS NAVIGATION CO.
Miami, Fla.

FLORIDA MACHINERY CORP.
Miami, Fla.

FLURY & CROUCH INC.
West Palm Beach, Fla.
President: T. T. Flury.
Vice Pres., Manager: A. B. Crouch.

FOGAL DRY DOCKS, INC.
Miami, Fla.

FOSTER BOAT COMPANY
Ferry Avenue
Charlevoix, Michigan
President: H. G. Foster.

Vice-President: Gar Wood, Jr.
Second Vice Pres.: V. S. Mancley.
Secretary: Glen E. Robinson.
Asst. Sec. and Treas.: C. A. Duerr.
General Manager: H. G. Foster.
Purch. Agent: Charles A. Duerr.
Prod. Mgr.: Gordon E. Clement.
Superintendent: C. S. Webster.
Chief Engineer: John K. Reed.
Production Mgr.: Gordon E. Clement.
Director of Engineering: Gar Wood, Jr.
Superintendent: Oscar Stroud.

FOSTER BOAT COMPANY
Canvas Division
436 E. Mitchell St.
Petoskey, Mich.
Prod. Mgr.: Ross Bliss.
Superintendent: Ross Alexander.

FRANKLIN LUMBER CO.
Port of Newark
Newark, N. J.

FREEPORT POINT SHIPYARD, INC.
Freeport, Long Island
Pres. and Naval Architect: Frederick Scopinich.
Vice Pres. and Purchasing Agent: Mirto Scopinich.
Secretary: Cornelius Thomsen.
Supt. Machine Shop: John Chersich.
Paint Shop Foreman: Joseph Tarabocchia.

FROEMMING BROTHERS, INC.
1905 South First Street
Milwaukee, Wis.
President-Treas.: B. A. Froemming.
Vice Pres.-Gen. Mgr.: S. H. Walker.
Secretary: I. B. Froemming.
Purchasing Agent: F. B. Meinhardt.
Asst. Purch. Agent: M. Elsaesser.
Superintendent: R. E. Hansen.
Naval Architect: T. L. Vose.
Production Manager: H. E. Gehrke.

FYFE'S SHIPYARD INC.
Glenwood Landing, Long Island, N. Y.
President: James Fyfe.
Vice Pres. and Treas.: A. M. Fyfe.
Sec. and Asst. Treas.: Wm. Anderson.
Manager: Archibald Fyfe.
Purchasing Agent: William Anderson.

GALBRAITH & SON, INC.
Keyport, N. J.

GAR WOOD INDUSTRIES
Marysville, Mich.
President: Glenn A. Bassett.
Vice Pres.: Ralph S. Jenkins.
Manager: Edwin C. Hancock.
Naval Architect and Chief Engineer: Walter Joachim.

GARY STEEL PRODUCTS CORP.
Norfolk, Va.
President: H. H. Gary.
Vice President: H. H. Gary, Jr.
Purchasing Agent: T. O. Day.

GENERAL ENGINEERING WORKS
Philadelphia, Pa.
President: M. T. Gemmell.
Vice President: E. J. Kirchner.
Manager: J. Frankl.

GENERAL SHIPBUILDING CORPORATION
17 East 42nd Street
New York, N. Y.
President: Robert K. Mickey.
Vice Pres.: Joseph H. Sinex and James D. Coleman.
Sec. and Treas.: William N. Halliday.
Asst. Sec. & Treas.: Emory G. Bullis.
Comptroller: Samuel L. Dunkerly.
Purchasing Agent: I. E. Reynolds.

GENERAL SHIP & ENGINE WORKS
East Boston, Mass.
President: Carl G. Hedblom.

GENERAL SHIP REPAIR CO.
Baltimore, Md.
President: Chas. B. Lynch.
Vice President: W. A. Lynch.
Secretary: W. A. Edgar.
Plant Superintendent: W. A. Lynch.

GIBBS GAS ENGINE CO.
Foot of Gibson Street
Jacksonville, Fla.
President: Geo. W. Gibbs.
Treasurer and Gen. Mgr.: George W. Gibbs, Jr.
Vice Pres.: Joseph D. Weed and John W. Donahoo.
Secretary: J. Roy Duggan.
Asst. Sec.: M. G. Johnson.
Purchasing Agent: T. A. Sharpe.

GINGRIS BOAT WORKS
Cocoa, Florida

GLOBE AMERICAN CORP.
101 East Broadway
Kokomo, Ind.
President: W. D. Harvey.
Vice Pres., Gen. Mgr.: A. P. Chester.
Sec. and Treas.: E. F. Orem.
Asst. Sec. and Treas.: A. F. Gifford.
Public Relations Director: Russell Ray.
Purchasing Agent: J. D. Illges.
Superintendent: James Trayers.
Chief Engineer: A. G. Sherman.

GLOBE SHIPBUILDING COMPANY
Superior, Wisconsin

GOUDY & STEVENS
East Boothbay, Me.
Officers: W. W. Goudy, J. A. Stevens.

GRAFTON BOAT WORKS
Grafton, Ill.
Officers: Samuel Edwards and E. R. Purdy.

GRAHAM BOAT COMPANY
Memphis, Tenn.
Owner and Manager: F. M. Graham.

GRAUS CONSTRUCTION COMPANY
Hastings, Minn.
President: W. C. Graus.

GRAVES, INC., JAMES E.
Marblehead, Mass.
President: E. Selman Graves.
Vice President: E. R. Copeland.
Treasurer: Edith P. Graves.
Secretary: Mildred H. Graves.
Manager: E. Selman Graves.
Purchasing Agt.: Robert E. Manning.

GRAY BOATS INC.
Thomaston, Maine
Pres.-Purch. Agt.: Malcolm F. Seavey.
Vice Pres.-Gen. Mgr.: Fred H. Ames.

GRAY'S IRON WORKS, INC.
Haden Bldg.
Galveston, Texas
President: B. L. Morse.
Vice President: C. N. Turner.
Naval Architect: O. C. Chapman & Co.

GREAT KILLS BOAT YARD
Staten Island, N. Y.

GREAT LAKES ENGINEERING WORKS
River Rouge, Michigan
President: Fred G. Morley.
V. P. & General Manager: George B. Turnbull.
Naval Architect: Dwight True.
Chief Engineer: Howard Varian.
Director of Purchases: George F. L Feuvre.
Detroit Plant
Superintendent: John Braden.
Ashtabula Plant
Asst. to General Mgr.: L. Feldmeye
Hull Superintendent: N. Fountain.
River Rouge
Asst. to General Mgr.: F. M. Scotte
Hull Superintendent: William Brush.

GREAT LAKES TOWING COMPANY
Cleveland, Ohio
President-Chairman of the Board: Chester W. Willett.
Vice President: H. N. Hobart.
Sec.-Asst. Treas.: George P. Bickfor
Assistant Sec.: G. G. Winter.
Treasurer: George G. Winter.
Purchasing Agent: L. F. Wood, Jr.
Superintendent-Supt. Machine Shop—Emil Krueger.

HENRY C. GREBE & CO., INC.
3250 N. Washtenaw Ave.
Chicago, Illinois
President: Henry C. Grebe.
General Supt.: A. C. Denne.
Purchasing Agent: F. W. Sullivan.
Shop Foreman: B. O. Volkman.

GREEN BAY DRY DOCK COMPANY
Green Bay, Wis.
President: Carl Hartmann.
Vice President: Arch McComb.
Manager: Carl Hartmann.
Naval Architect: Fred Saunders.
Chief Engineer: H. Larsen.
Purchasing Agent: Carl Hartmann.

GREENPORT BASIN & CONST. CO.
Greenport, L. I., N. Y.
President: Theodore W. Brigham.
Vice President: Geo. H. Snyder.
Sec.-Treas.: Marshall E. Tulloch.
Naval Architect and Chief Engineer: Norman E. Klipp.
Purchasing Agent: Arthur J. Utz.

GREENVILLE MANUFACTURING & MACHINE WORKS, INC.
Greenville, Miss.
President: Fred Schelben.
Vice President: Eric Schelben.
Mgr. and Purch Agt.: Emil L. Nick.

GREENWICH PIERS RAILWAY CO.
Greenwich Piers Road
Greenwich, N. J.
President: Hattie A. Shillingsburg.
Vice President: Allan Harris.
Manager: Wm. Whitten.
Purch. Agt.: George N. Shillingsburg

THE GREENWICH SHIPBUILDING & REPAIR CO.
Philadelphia, Pennsylvania
Plant: Greenwich, New Jersey

GREENWICH SHIPYARD, INC.
Greenwich, Conn.
President: H. P. Whitmore.
Vice President: F. W. Brown.
Purchasing Agent: M. Glinka.

GULF COAST TOWING CO., INC.
Slidell, La.

GULF MARINE WAYS OF GALVESTON INC.
Galveston, Texas

GULF SHIPBUILDING CORP.
Chickasaw, Ala.
President: E. A. Roberts.
Executive Vice Pres.: N. Nicolson.
Vice Pres. and Gen. Mgr.: H. Hill.

Chief Engineer: J. Findall.
Purchasing Agent: C. L. Buerger.

GULFPORT BOILER & WELDING WORKS, INC.
P. O. Box 1179
Port Arthur, Texas
Pres.: B. R. Schulz.
Gen. Mgr.: E. R. Standfuss.
Vice Pres. & Naval Architect: E. W. McCarthy.
Chief Engineer: R. G. Hunt.
Outfitting Supt.: E. Philiskirk.
Asst. Outfitting Supt.: V. A. Schulz.
Welding Supt.: F. Schuh.
Hull Supt.: A. J. Conway.
Purch. Agent: A. H. Pressler.

GULFPORT SHIPYARD
Gulfport, Mississippi

GULLIFORD YARD
Sagus, Mass.

HACKER BOAT CO.
9 Judge St., P. O. Box 247
Mt. Clemens, Michigan
Pres.-Gen. Mgr.: S. D. McCready.
Vice Pres.: C. P. McCready.
Secretary: R. F. McCready.
Treas.-Comptroller: Donald G. Smith.
Purchasing Agt.: Leo Flood.
Supt. Hull Outfitting: John Tesmer.
Naval Architect: Dair N. Long.
Supt. Machinery Installation, Supt. Machine Shop: Albert Slocum.
Paint Shop Foreman: Fred Hess.

HAMILTON MARINE CONTRACTING CO., INC.
Brooklyn, N. Y.
President: Thomas S. Rinaldi.
Vice President: Malcolm L. Worrell.
Sec. and Treas.: Valentine P. Esposito.
Chief Engineer: H. L. Moeller.
Purchasing Agent: Thomas S. Rinaldi.

HAMME MARINE RAILWAY
Eagle Island, Wilmington, N. C.
Pres. and Mgr.: R. F. Hamme.

HAMMOND SHIPBUILDING CORP.
Chicago, Illinois

HANLEY ENGINEERING SERVICE
Prospect, Ohio
Owner: K. Hanley.
Purchasing Agent: M. J. Hanley.

HANSON WELDING CO., HANS
318 Washington Street
Toledo, Ohio
President: Hans Hansen.

HARBISON, E. J.
Schenectady, N. Y.

HARRIS LUMBER & TOWING CORP.
New Orleans, La.

HARRIS & PARSON, INC.
East Greenwich, R. I.
President: Thomas Harris.
Secretary-Treasurer: Robert Parsons.

HARRISBURG MACHINE COMPANY, INC.
Houston, Texas
President and Manager: R. A. Fenzl.
Vice President: R. J. Fenzl.

HARRISON BROS.
Fort St. Anthony
Mobile, Ala.

HARVEY CANAL SHIPYARD & MACHINE SHOP
Harvey, La.

HATHAWAY MACHINERY CO., INC.
Fairhaven, Mass.
President: Eli G. Braley.
Treasurer: Chester F. Hathaway.

HEDLEY BOAT CO.
Olcott, N. Y.

HELDENFELS BROS.
Rockport, Texas

HENRICKSON COMPANY, G. A.
Cleveland, Ohio
President: G. A. Henrickson.
Purchasing Agent: E. J. McGraw.

HENSLER, KOFOED COMPANY, INC.
Keyport, N. J.
Pres.-Purch. Agt.: H. Martin Kofoed.
Vice Pres.: Harold Kofoed.

HERON MANUFACTURING CO.
San Diego, Calif.

HERRESHOFF MANUFACTURING CO.
20 Burnside Street
Bristol, R. I.
President: R. F. Haffenreffer.
Vice-Pres.-Sec.: C. W. Haffenreffer.
Treasurer: R. F. Haffenreffer, III.
Assistant Secretary: K. Connolly.
Comptroller: W. A. O'Connor.
General Manager: C. W. Haffenreffer.
Purchasing Agent: T. P. Brightman.
Asst. Gen. Mgr.: F. W. Haffenreffer.
Naval Architect-Chief Engr.: A. S. Dew Herreshoff.

HIGGINS INDUSTRIES, INC.
New Orleans, Louisiana
President: A. J. Higgins, Sr.
Vice Presidents: F. P. Higgins, A. J. Higgins, Jr., and F. O. Higgins.
Sect.-Treas.: Morris Gottesman.
Asst. to Pres.: Geo. W. Rappleyea.
Chief Engineer: Geo. O. Huet.
Naval Architects: A. J. Higgins, Sr., and Geo. O. Huet.
Chief Electrical Engineer: M. L. Levy.
Gen. Superintendent: E. C. Higgins.
Superintendent: Arthur Derbins.
Purchasing Agent: Alex J. Ellsworth.
Fabricating Shop Foreman: Arthur Derbins.
Machine Shop Foreman: Joseph J. Dugas.

HIGGS MARINE SERVICE
300 Zenega Avenue
Bronx, N. Y.
Partners: Geo. J. Schmidt, and Wm. T. Higgs.

HILBILT BOATS
Madison, Ind.
President: O. B. Hill.

HILLMAN BARGE & CONSTRUCTION CO.
1926 Grant Bldg.
Pittsburgh, Pa.
Chmn. of the Bd.: J. H. Hillman, Jr.
President: Capt. John L. Howder.
Vice President: Ross I. Davis.
Treasurer: J. M. Leithead.
Secretary: Thos. Watson.
Purchasing Agent: J. H. Huddart.
General Manager and Naval Architect: Clifton H. Handy.
Superintendent: Frank Silliman.

HILLMAN TRANSPORTATION CO.
Dravosburg, Pa.
President: J. H. Hillman, Jr.
Vice Pres.: Ross I. Davis, A. B. Sheets.
Operat'g Vice Pres.: John L. Howder.
Purchasing Agent: J. H. Huddart.

HILTEBRANT DRYDOCK CO., C.
Kingston, N. Y.
President: O. R. Hiltebrant.
Vice Pres. & Treas.: S. D. Hiltebrant.
Secreatry: Fred J. Walter.
Naval Architect and Manager. O. R. Hiltebrant.

HINCKLEY & CO., HENRY R.
Southwest Harbor, Maine
President: H. R. Hinckley.
Treasurer: Benjamin B. Hinckley, Jr.
Purchasing Agent: Wm. Johnston.
General Manager: M. Fahey.
Naval Architect: Cyrus Hamlin.

HODGDON BROS. & GOUDY & STEVANS
East Boothbay, Maine

HOLTZ BOAT WORKS AND BASIN, INC.
Ocean City, N. J.
President: Carl F. Holtz.
Vice President: Wm. Price, Jr.
Manager: Carl F. Holtz.

HOUMA BOAT & CONTRACTING CO., INC.
Houma, La.
President: W. A. Ellender.
Vice President: C. J. Brown.
Naval Architect: J. A. Pullen.

HOUSTON SHIPBUILDING CORP.
Houston, Texas
President: Arthur Stout.
Chmn. of Board: John D. Reilly.
Senior Vice Pres.: J. L. Lawder.
Asst. Gen. Mgr.: R. W. Morrell.
Vice Pres.: Joseph Hagg, Jr., Frank A. Liddell.
Treasurer: Charles F. Stenz.
Mgr. of Engineering: E. C. Pugh.
Purch. Supt.: R. D. Rockwell.

HOWARD BOAT WORKS, INC.
633 Ballough Road
Daytona Beach, Fla.
Pres.-Treas.: J. R. Anderson .
Vice Pres.-Mgr.: J. H. Howard, Sr.

HOWARD SHIPYARDS & DOCK CO.
Box 468
Jeffersonville, Ind.
President: James E. Howard.
Sec.-Treas.: Loretta M. Howard.
Purchasing Agt.: Edward J. Howard.

HUBBARD COMPANY, THE S. B.
Jacksonville, Fla.
President: A. S. Hubbard.
Vice Pres.: F. M. Cooper and John C. Gray.

HUCKINS YACHT CORP.
Jacksonville, Fla.

HUDSON RIVER SHIPYARDS CORP.
Newburgh, N. Y.
President: Stirling Tompkins.
Vice Pres.: E. B. Karr.
Sec. and Treas.: R. W. Jones, Jr.
Purchasing Agent: New York Office, 230 Park Ave., Jack Finnigan.

HUMPHREYS RAILWAYS, INC., THE
Weems, Va.
President: H. R. Humphreys.
Vice President: O. Humphreys.
Treas. and Sec.: M. Etta Cornelius.

Chief Naval Architect: H. R. Humphreys.
Purch. Agt.: H. R. Humphreys.
Mach. Shop Foreman: Milton Davis.

HUTCHINSON'S BOAT WORKS, INC.
Alexandria Bay, N. Y.
President: J. H. Hutchinson.
Vice President: Raymond Rogers.

INDUSTRIAL CONSTRUCTION CORP.
307 Sellwood Bldg.
Duluth, Minnesota
President: Harold St. Clair Starin.
Vice President: J. D. Harrold.
Manager: Lewis G. Castle.

THE INGALLS SHIPBUILDING CORP.
Birmingham, Alabama
Yards: Pascagoula, Miss. (Gulf), and Decatur, Ala. (Tennessee River)
Chairman of the Board: R. I. Ingalls, Sr., Birmingham.
Vice Chairman of the Board: R. I. Ingalls, Jr., Birmingham.
President: Monro B. Lanier, Birmingham.
Executive Vice President: W. R. Guest, Pascagoula.
Sec. Treas.: M. R. Pixton.
Comptroller: E. R. Hammett, Pascagoula.
Chief of Eng. Division: A. C. Leigh, Pascagoula.
Purchasing Agent: John W. Keily, Birmingham.

ROBERT JACOB, INC.
154 Pilot St.
City Island, New York
President: Robert Jacob.
V. P. & Supt.: Joseph Harvey.
Naval Architect: Robert Jacob.
Chief Engr.: Howard Wilson.
Purchasing Agent: John Morrison.

J. A. JONES CONST. CO., INC.
Wainwright Yard, Panama City, Fla.
President: J. A. Jones.
Vice President: Raymond A. Jones.
Executive Asst.: Daniel W. Bateman.
Chief Engineer: C. C. Clark.
Purchasing Agent: B. H. Fox.
USMC Hull Inspector: H. S. King
USMC Machinery Inspector: Gerald Desmond.
USMC Plant Engr.: H. A. Treat.

JOHNSON BOAT WORKS, INC.
Shore Beach
Branford, Conn.

KAISER CO., INC.
No. 430, 30 Church Street
New York City
Manager: M. Nicholls.

LANCASTER IRON WORKS, INC.
Lancaster, Pennsylvania
Pres.: W. W. Posey.
Vice Pres.: J. S. Posey.
Shipyard at Perryville, Md.
Manager: E. H. Wood.
Naval Arch.: A. F. Ritter, Jr.
Purch. Agent: H. H. Breneman.
Chief Engr.: C. I. Miller.

GEORGE LAWLEY & SON CORPORATION
26 Ericsson St.
Neponset, Massachusetts
President: Frank C. Paine.
Vice Presidents: Edward D. Whiting & James J Minot.
Manager: Edward Whiting.
Naval Arch. & Chief Engr.: Wm. F. McNary.
Purchasing Agent: J. H. Drury.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas
President: E. W. Brown, Jr.
Vice Pres.: Capt. G. M. Levingston.
Vice President: Ed. T. Malloy.
Vice President: E. W. Brown III.
Chief Engineer: W. L. Ulcher.
Purchasing Agent: Eugene Harmon.

LINDSTROM, EDWIN O.
Shippan Ave.
Stamford, Conn.

THE LUDERS MARINE CONSTRUCTION CO.
Stamford, Connecticut

LYONS CONSTRUCTION CO.
Whitehall, Michigan
President: I. J. Lyons.
Manager: Frank M. Warner.
Purchasing Agent: Frank M. Warner.

MacEVOY SHIPBUILDING CO.
Savannah, Georgia
President: Clifford F. MacEvoy.
Vice President: Warren J. MacEvoy.
Naval Architects: Kindlund & Drake, N.Y.C.
Chief Engineer: Joseph Di Stasio, N.Y.C.
Purchasing Agent: Wallace G. Hooper.

McBRIDE BOAT WORKS
Harrod's Creek, Kentucky
Owner: Capt. L. B. McBride.

SCOTT J. McBURNEY
Avenue U and Mill
Brooklyn 10 New York.
Sole Owner and Purch. Agent: Scott J. McBurney.

McCLOSKEY & CO.
P.O. Box 2512
Houston, Texas
President: M. H. McCloskey, Jr.
Vice President: J. C. McCloskey.
Project Mgr.: M. H. McCloskey, III.
Chief Engr.: N. Ross.
Purch. Agent: John J. Lynam.

MADISON MARINE WAYS
Madison, Indiana
Owner: Marx J. Raymond.

MANITOWOC SHIPBUILDING CO.
Manitowoc, Wisconsin
President: Charles C. West.
Vice Presidents: A. P. Rankin, A. L. Pitz, J. E. Thiell, W. L. Wallace.
Secretary: J. E. Thiell.
Treasurer: A. L. Nash.
Asst. Treasurer: J. A. Egan.
Assistant Sec.: F. C. King.
Ast. Sec. & Asst. Treas.: E. N. Fors.
Gen. Supt.: A. L. Pitz.
Naval Architect: W. L. Wallace.
Chief Engineer: A. P. Rankin.
Purchasing Agent: H. A. Meyer.

MARIETTA MANUFACTURING CO.
Point Pleasant, West Virginia
President: C. O. Weissenburger.
Asst. to the President: J. T. Weissenburger.
General Supt. in Charge of Production: A. Cruickshanks, Jr.
Plant Manager: M. L. Miller.
Chief Engineer: Carl F. Jeffries.
Machine Shop Supt.: G. H. Overholt.
Shipyard Supt.: John Roberts.
Manager of Sales: F. W. Ingraham.
Purchasing Agent: S. C. Wilhelm.

MARINE IRON & SHIPBUILDING CO.
Foot of 11th Ave.
Duluth, Minnesota
President: A. W. Leraan.
Vice President: A. W. King, Sr.
Manager: John Geistman.
Naval Architect: Manfred Malmros.
Chief Engineer: Swan Larson.
Purchasing Agent: R. W. Saeger.
Treasurer: C. B. Bawerle.

MARINE MAINTENANCE CORP.
Foot of East 21st St.
Bayonne, New Jersey
President: Gregory Ferend.

MARINETTE MARINE CORP.
Marinette, Wisconsin
President: C. H. Boren.
Vice Pres. and Manager: M. C. Hellerman.
Naval Architect: M. A. Deering.
Yard Superintendent: P. Kargard.
Purchasing Agent: R. Erdlitz.

JOHN H. MATHIS CO.
Point and Erie
Camden, New Jersey
President: J. E. Sheedy.
Treasurer: W. E. Robinson.
Secretary: E. W. Robinson.
General Manager: Harry N. Ghenn.
Hull Superintendent: J. Boyle.
Chief Engineer: A. C. Nicholson.
Purchasing Agent: J. J. Williams.

MATHIS YACHT BUILDING CO.
Gloucester, N. J.
(See John Trumpy & Sons, Inc.)

McNULTY SHIPYARDS, LTD.
9 Summit
Brooklyn, New York

W. H. McPHERSON CONST. CO., INC.
No. 6 Webster Ave. N.
Bangor, Maine
(Stockton Springs Yard)

MIAMI SHIPBUILDING CORP.
Miami, Florida
Pres. & Purchasing Agt.: Theodore C. Buhler.
General Manager: Paul H. Buhler.
Sales Manager, Yacht Division: J. T. Pugh.
Naval Architect: J. E. Buhler
Chief Engineer: S. Stewart, Jr.

MORSE BOATBUILDING CO.
Thomaston, Maine
President: Wilbur J. Morse.
Purchasing Agent: W. J. Morse.

MYSTIC SHIPYARD, INC.
Willow Pt.
West Mystic, Conn.

NASHVILLE BRIDGE CO.
Nashville, Tennessee
Pres. & Nav. Arch.: H. B. Dyer.
V. P. & Gen. Mgr.: L. C. Anderson.
Erection Department: F. W. Blair.
Purchasing Agent: Wesley H. Dyer.
Auditor: C. J. Hays.
Chief Engineer: L. O. Hopkins.
Supt. Nashville Plant: J. H. Anderson.
Supt. Bessemer Plant: William Rodgers.

NAVAL CONSTRUCTOR COMPANY
786 Eustis
St. Paul, Minnesota
Partner: E. T. Schreiber.
Partner: F. A. Gagnon.
Naval Architect: E. T. Schreiber.

NEW ENGLAND SHIPBUILDING CORP.
South Portland, Maine

THE NEW YORK SHIPBUILDING CORPORATION
Camden, New Jersey
Chairman: J. F. Metten.
Pres. and Gen. Mgr.: Roy S. Campbell.
Vice Presidents: N. R. Parker and T. H. Bossert.
Naval Architects:
Design: E. H. Rigg.
Construction: Harry Rhodes.
Chief Engineer: A. H. Mills.
Electrical Engineer: J. Elmer Smith.
Purchasing Agent: J. W. Meeker.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
4101 Washington Ave.
Newport News, Virginia
Chairman of the Bd. and President: H. L. Ferguson.
Executive Vice Pres.: Roger Williams.
Vice Pres. & Gen. Mgr.: J. B. Woodward, Jr.
V. P. & Prod. Mgr.: W. E. Blewett, Jr.
V. P. & Works Mgr.: E. F. Heard.
Naval Architect: S. A. Vincent.
Director of Engr.: John F. Nichols.
Chief Engineer: Frank R. Benson.
Assistant Chief Engineers: H. C. Berrian and Roger V. Terry.
Purchasing Agent: H. K. Peebles.

NOANK SHIPBUILDING CO.
Noank, Conn.

NORWALK BOAT WORKS
160 Water South
Norwalk, Conn.

NORTH CAROLINA SHIPBUILDING CO.
Wilmington, North Carolina
President: Roger Williams.
Vice President and General Manager: P. F. Halsey.
Secretary: Storer P. Ware.
Hull Superintendent: J. A. Maclay.
Purchasing Agent: H. K. Peebles.
Asst. Purchasing Agent: L. K. Hoxton.
Production Supt.: W. C. Park.

ODENBACH SHIPBUILDING CORP.
4900 Dewey Ave.
Rochester, N. Y.

OVAL BARGE ENGINEERING CO.
Chicago, Illinois

PALATKA SHIPBUILDING CO.
P.O. Box 471
Palatka, Florida
President & Manager: J. W. Campbell.
Vice President: R. K. Tavel.

PENDLETON SHIPYARDS CO., INC.
1800 Masonic Temple
New Orleans, Louisiana
President: Pendleton E. Lehde.
V. P. & Gen. Mgr.: Robert W. Elsasser.
Production Mgr.: F. A. Geffs.
Plant Engineer: C. H. Hill.
Purchasing Agent: Anton G. Bauer.

PENN-JERSEY SHIPBUILDING CORP.
5th and Byron
Camden, New Jersey
Pres. & Chrmn. of Brd.: W. H. Beal.
Vice Pres. & Gen. Mgr.: E. R. Allen.
Treasurer: R. M. Dorsch.
Purchasing Agent: G. G. Cook.

PENNSYLVANIA SHIPYARDS, INC.
Beaumont, Texas
President: L. B. Coppinger.
Superintendent: L. C. Allen.
Purchasing Agent: C. E. Deakle.
Asst. Superintendent: F. Perugi.
Construction Supt.: B. A. Brown.
Vice Pres.: H. Slade.
Treas.: J. H. McGregor.
Sec'y: J. E. Battarbee.

PETERSON BOAT WORKS
Sturgeon Bay, Wisconsin
Pres. & Gen. Mgr.: Fred J. Peterson.
Assistant Gen. Mgr.: Ellsworth L. Peterson.
Chief Draftsman: Robert E. Peterson.
Naval Architect: Fred J. Peterson.
Superintendent: Melvin Christenson.
Production Mgr.: Milton Schmidt.
Electrical Engineer: Howard Bosman.
Specification Eng.: E. A. Berkovitz.
Personnel Mgr.: Kenneth Mearns.
Office Mgr.: Richard W. Hitt.
Secretary: D. Stuth.
Treasurer: I. L. Peterson.

PHOENIX ENGINEERING CO.
Office: 161 W. Wisconsin Ave.
Milwaukee, Wisconsin
Plant: Baltimore, Md.
Pres.: Hans H. Doe.
Vice Pres.: Paul H. Doe.
Mgr.: Hans H. Doe.
Naval Arch.: S. E. Sonnichsen.
Purchasing Agt.: E. T. Lueck.

PROCTOR YACHT WORKS
Burlington, Vermont
Pres.; W. R. Christopherson.
Vice Pres.: R. H. Spear.
Treas.: H. S. Crane.
Yard Supt.: W. H. Brown.

THE PUSEY & JONES CORP.
Front and Poplar Streets
Wilmington, Delaware
Pres. & Gen. Mgr.: A. G. Spiegelhalter.
V. P. in Charge of Sales: C. S. Lee.
Marine Manager: E. A. Hodge.
Naval Architect: D. J. Brown.
Chief Engineer: P. E. Ohlson.
Purchasing Agent: H. W. Cornelius.

R. T. C. SHIPBUILDING CORP.
Delaware Ave. and State
Camden, New Jersey
Pres. and Mgr.: L. M. Robinson.
V. P. and Naval Arch.: Geo. R. Taylor.
Chief Engineer: E. G. Brownlee.
Purchasing Agent: H. F. Wanderlin.

RAMALEY BOATWORKS
Wayzata, Minnesota
Plant: Ozona, Lake Minnetonka, Minn.
President: J. E. Ramaley.
V. P. & Chief Engr.: Lieut.-Comdr. Waldo J. Elhman.

Naval Architect: Bob Barell.
Purchasing Agent: Dwight Jones.

REYNOLDS MARINE STATION
Old Lyme, Conn.

RHEEM MANUFACTURING COMPANY
(See Walsh-Kaiser Co., Inc.)

RICE BROTHERS CORP.
East Boothbay, Maine
President: William E. Rice.
Plant Superintendent: W. E. Rice.
Purchasing Agent: Henry W. Rice.

RICHARDSON BOAT CO.
North Tonawanda, New York
President: Sidney S. Walcott.
Vice President: Leon E. Travis.
Manager: James G. Nogle.
Chief Engineer: Ernest G. Murray.
Purchasing Agent: Kenneth B. Dodds.

ROGERS TOWNSEND BOAT CO.
Pasadena, Maryland
Exec. Vice Pres.: Joseph Haag, Jr.
V. P. in Charge of Finance: G. V. Pach.
V. P. in Charge of Production: T. R Allen.
V. P. in Charge of Procurement: R. F. Hill.
General Manager: T. B. Pinkham.

ST. JOHNS RIVER SHIPBUILDING CORP.
115 Florida Ave.
Jacksonville, Florida
President: James C. Merrill.
Vice President: Kenneth A. Merrill.
Gen. Mgr.: Denis J. O'Mahoney.
Naval Architect: George F. Crouch.
Production Manager: W. B. Drevitson.
Purchasing Agent: R. J. Healey.

ST. LOUIS SHIPBUILDING & STEEL CO.
Foot of Arlee St.
St. Louis, Missouri
President: H. T. Pott.
Manager: E. M. Enslin.
Naval Architect: Arthur R. Parsons.
Chief Engr.: M. A. Nelson.
Purchasing Agent: R. C. Bradshaw.

W. C. SALLEY
Monroe, Louisiana

SAN JACINTO SHIPBUILDERS, INC.
Houston, Texas

SCOTT GRAFF COMPANY
2402 West Michigan Street
Duluth, Minn.
President: A. M. Thompson.
Vice Pres. & Mgr.: E. J. Gottschalk.

LEATHEM D. SMITH SHIPBUILDING COMPANY
Sturgeon Bay, Wisconsin
President & Gen. Mgr.: L. D. Smith.
Vice President: Edw. Weber.
Gen. Supt.: C. R. Christianson.
Naval Architect: Richard Stearns.
Chief Engineer: Chas. Cowan.
Purchasing Agent & Secretary: C. D. Brower, Jr.
Marine Engineer: L. G. Rummel, Jr.

SOL'S BOAT WORKS
Grove St.
Clinton, Conn.

SOUTHEASTERN SHIPBUILDING CORP.
P.O. Box 1881
Savannah, Georgia
President: Wm. H. Smith.
Exec. Vice President: C. S. Atwell.
V. Pres. & Gen. Mgr.: William Perrott.
Comptroller: L. R. Portney.
Chief Engineer: E. L. Bennett.
Purchasing Agent: H. J. Fair, Jr.

SOUTHERN DRY DOCK & SHIPBUILDING CO.
Blakely Island
Mobile, Ala.

SPEAR BROS.
Burlington, Vermont

STEPHENS SHIPBUILDING COMPANY
Fernandina, Florida

STONINGTON BOAT WORKS
Church Street
Stonington, Conn.

STOWMAN SHIPYARDS
Dorchester, N. J.

SUN SHIPBUILDING AND DRY DOCK COMPANY
Foot Morton Ave.
Chester, Pennsylvania
President: John G. Pew.
Vice Presidents: Robert Haig, R. L. Burke, John G. Pew, Jr.
Treasurer: William Craemer.
Assistant Treasurer: J. Newton Pew.
General Manager: R. L. Burke.
Purchasing Agent: H. W. Scott.

Naval Architect: J. W. Hudson.
Chief Engineer: J. H. G. McConechy.
N. Y. Representative: J. T. Borden.
Secretary: William Craemer.

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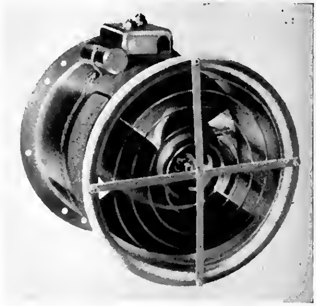
Naval Architect: H. W. Miller.
Gen. Supt.: Fred Hontoon.
Purchasing Agent: Roy Emanuelson.

Indian Salmon Marketed

Fish caught by Washington Indians is being received in the Seattle market in increased quantities. The United States Fish & Wildlife Service says that Indian-caught chum salmon continues to be the leading item of fresh fish arriving in Seattle. One Indian buyer, who made purchases from the members of his tribe, delivered approximately 100,000 pounds of chum salmon in the Seattle market in December.

The salmon comes to Seattle by truck from Indian reservations, and is caught in the Nisqually River, between Tacoma and Olympia, and in the Snohomish River, at the head of Hood Canal in Mason County, Washington.



Lightweight High-Pressure Axial Flow Fan

Designed as a single, two-blade propeller job for recirculation of cabin air through gasoline combustion heaters, for use on medium and heavy bombers and light, fast boats, the unit shown (inside diameter 6″, weight 5.7 lbs.) is powered with a 1/5 hp. series wound 24-28-volt motor, and delivers 320 cfm standard air at sea level against two inches water gage pressure. (450 cfm against 1½″, at 20,000 feet altitude.) It is manufactured by Dynamic Air Engineering, Inc., Los Angeles, Calif.

Recently the power has been increased to ½ hp and a second propeller added on a double-extended shaft to put 25 per cent more volume at double the original pressure.

Still another unit of 7″ diameter is now in the final stages of development and will deliver approximately 600 cfm at 5″ of pressure.

Employees Save Man-Hours

Thanks to the inventive genius of its workers, Richmond Shipyard No. 2, Permanente Metals Corporation, effected in 1943 a saving of 2,360,477 man-hours, 6085 crane-hours, and 1496 truck-hours. Thus the development of new methods, gadgets and jigs saved time enough to provide for the construction of six Liberty ships in 1943.

Appointed to New Posts

Two officers of the U. S. Coast and Geodetic Survey, **Commanders John H. Peters and George C. Mattison,** who are widely known on the Pacific Coast, have been assigned to new posts.

Commander Peters, who has served the survey in Puerto Rico, Hawaii, the Philippines, Alaska and on the Gulf Coast, has been appointed supervisor of the service in the New Orleans District. He has been liaison officer on the staff of the commanding Admiral in the Aleutian Islands.

Commander Mattison, who recently made a survey of bases in the Atlantic which the United States obtained from Great Britain in exchange for 50 destroyers, has been appointed supervisor of the service in the New York District. His last ship on the Pacific Coast was the Explorer.

Commendatory Letter On Liberty Ship

Vice President John A. McCone of the California Shipbuilding Corporation received a letter of high praise on the S. S. Elbridge Gerry as based on the observations of Chief Officer, John A. Konecny. He based his comments after completion of the vessel's fourth voyage and her log showed 40,000 miles and as he said: "About as fine a ship as was ever launched and the best vessel I ever sailed."

New Offices

The Burns Steamship Company now have their offices located in San Francisco at 200 Bush Street. Their Los Angeles offices are now at 727 West Seventh Street. Heretofore, the Southern California headquarters had been in Beverly Hills.

Circulating Wall Fan For Shipboard

Trade-Wind Motorfans, Inc., has recently brought out a new marine wall circulating fan. It is of sturdy construction with an 8-inch quiet-type impeller that delivers 500 cfm with good velocity and without draft. The wall attaching bracket is of special design, permitting easy adjustment of the fan to any desired direction.

These fans are made of non-critical materials, hot-dipped galvanized for protection from corrosion. The motors are of 12-, 24- or 32-volt current, and are totally enclosed, insuring safe, trouble free operation.

"Nautical Rules of the Road"

The Coast Guard has written a much-needed book and has done a fine job. It is a concise, well-illustrated volume, presenting to the layman as well as the mariner the more important laws, rules and regulations known as "The Pilot Rules." This book is also important and useful to those who love to sail and who operate their own boats—and for those whose duty takes them in ships. It is published by the United States Coast Guard.

Pacific Marine Review

MARCH 1944

NEW ROPE

1 Be careful to read the instructions on the tag when opening new coils of rope. They are important. To uncoil rope, set the coil on its flat side with the inside tag end nearest the deck. Then reach down through the center and draw the rope up through the inside of the coil. By this method the direction of uncoiling is counter to the direction of the turn and kinking is avoided.

EVERYDAY CARE

2 Remove all kinks before putting any strain on rope. Kinks pulled through restricted space, such as a tackle block, will shear the fibers and weaken the rope. Kinking in large ropes is serious because, when a kink has once formed, and a strain is placed upon the rope, it is not possible to restore the distorted strands to their correct position. The kinked section of a rope may be expected to fail at loads of twenty to thirty per cent below the strength of a section not kinked.

3 Avoid dragging rope over dirty decks, docks, or on the ground. Particles of sand, coal, fertilizer and other bulk cargo find their way into the inner sides of the strands and cut the fiber when the rope is being worked.

4 When splicing a rope into beckets of blocks on shackles or other metals, put a thimble in the eye.

5 When the use of rope involves continual twisting in one direction, compensating turns must be thrown in or out to avoid damage to the rope structure.

6 Reverse rope, end for end, periodically as in tackle use, so that all sections of the rope will receive equal wear. When rope wear is localized in a short section, periodical shortenings present a new wearing surface.

7 Should a rope become damaged, cut and splice. A good splice is safer than a damaged section.

8 When using cargo whips, take the turns on the winch first one way and then the reverse. This will keep the kinks and turns out.

9 The safety of a rope decreases rapidly with use dependent to some extent upon the amount of strain. This is due to the fact that the fibers slip a small amount under each strain in spite of the twisting.

CHAFING AND ENTANGLEMENT

10 Don't use chain stoppers on rope. Use rope stoppers. Chain will cut the fibers and kink the rope.

11 Keep rope away from winch gears, machinery, and other moving parts. They frequently become chafed or entangled with the mechanism.

12 Be careful not to drag rope over sharp edges. Fibers chafe easily. Use chafing gear on lines laying in chocks or over sharp edges.

13 Keep rope from touching stays, guys, or other standing rigging when working cargo or underway, especially when light. Rigging vibration will chafe the rope.

MOORING LINES

14 Do not surge rope on running niggerheads or capstans. Stop the winch or capstan when surging or slacking away.

15 When surging lines around bitts, take off enough turns so that it will surge smoothly, and not with jerks.

16 Keep the strains on mooring lines even. Take up the slack when necessary.

17 Taut dry ropes should be immediately slacked off when wet by rain, especially long running gear and signal halyards.

18 Rat guards with sharp edges should not be used. Fasten them tightly so they won't turn on the lines. Use chafing gear under the rat guards.

UNITED STATES MARITIME COMMISSION 1936

A SALUTE TO THE UNITED STATES MARITIME COMMISSION

FOR THE SPLENDID JOB THEY HAVE DONE IN BUILDING AMERICA'S MERCHANT MARINE TO ITS PRESENT POSITION OF WORLD LEADERSHIP

The United States Maritime Commission fully realizes the necessity of making rope last longer. On this page we quote their 38 pointers on rope conservation. We suggest that you tear out this page and pass on to those responsible for rope care. Also send for booklets "The Rope You Save Fights For You" and "14 Ways To Make Rope Last Longer" and for illustrated Rope Conservation Chart.

This advertisement is published in co-operation with the National Rope Conservation Campaign

TACKLE ROPE

19 Use the proper size block and make sur right size rope is used in rigging tackle. She too small are as bad as sheaves too large. B should be three times the circumference, sheaves should be at least twice the circumfer of the rope.

20 Examine blocks for rusty, frozen, or br sheaves at regular intervals. Repair or rep damaged ones immediately. Blocks shoulc overhauled and lubricated frequently.

21 Short nips through fair leads, blocks, ch etc., break fibers and weaken rope.

LIFEBOAT FALLS

22 Lifeboat falls require constant atten Care should be taken to keep the rope dry aired whenever possible.

23 During war operations, boats are kept sv out in the davits. When reeving off new falls, have sufficient length so the section carr the boat in the davits can be cut off twice anc fall still be of sufficient length. By this means turning falls end for end, considerable fiber be saved.

ROPE STOWAGE

24 Rope should not be coiled down on the deck. Mooring lines should be coiled on grat or dunnage. Small lines should be coiled or up on belaying pins or cleats.

25 Cover coiled rope with canvas when in for any length of time.

26 When stowing mooring lines, guys, prev ers, heaving lines and other rope in hatchw or on top of cargo, be sure it is stowed so as to fall in between cases. The working of the on a long voyage will practically sever the r

27 Stow rope away dry. Always examine rope strands to see that they are dry before s ing below deck.

28 To prevent dry rot when stowing rope be decks and in confined spaces be sure it is off deck and subject to a free circulation of air.

29 Before using rope which has been sto away for any length of time, look at the core inner strands for dry rot.

30 Ropes should not be stowed in wet or d holds or compartments.

31 Never allow rope to come in contact acid, fumes, winch drums, steam pipes or exces heat. Many chemicals are very injurious to r fibers, and will cause severe rope damage. R should not be stored in close proximity to che cals, especially acids or alkalis, or where con with chemicals or fumes may result.

32 Do not lubricate fiber rope. A well-m rope is properly lubricated by the manufactu and adequate for its service life.

SAVE ALL ROPES

33 Save all rope and "shakings" no matter l small. Impress your crew with the necessity the economical use of rope.

34 Turn in all rope and rope ends not usable board ship at the home port for disposal thro the operators. Rope in practically any conditi can be reprocessed and used again.

35 Use rope ends and rope yarns for whipp larger ropes and lashing small things.

36 Whip or splice all rope ends, particularly lashings. Lashings removed should be saved used again.

37 Keep rope ends from hanging over the sid In some ports long lengths of rope have b stolen. Small boats come along side at night, take all or cut as much rope as possible.

38 Use old wire whips for mooring lines on ca lighters alongside.

TUBBS CORDAGE COMPANY
SAN FR

PORTLAND CORDAGE COMPAN
PORTLAND SEATTLE

Pacific MARINE REVIEW

Contents - - - - - - March, 1944

Official Organ

Pacific American Steamship Association

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Shipowners Association of the Pacific Coast

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Pacific MARINE REVIEW

Cracking Down on the Cracks

Much excited comment has appeared in recent press notices over the fact that a few EC-2 (Liberty) cargo steamers have cracked at sea, endangering, and in one or two cases involving, the lives of their crews.

This comment runs all the gamut of causes and responsibilities. Blame has been placed on: bad welding, improper design; poor steel; reciprocating steam engines; and careless inspection. Responsibility is referred: to the Maritime Commission; to the shipbuilders; to sabotage; to Kaiser; and to the lack of experienced ship's officers.

So far as we know the history of this matter, some twenty cases of minor or major cracking of Liberty steamers have been uncovered by the present investigation. In only one of these instances has the ship or any of the crew been lost. Over 1800 Liberty cargo steamers have been delivered to the Maritime Commission. Twenty cracked through structural failure under stress of weather is slightly more than one per cent, or, to be exact, slightly less than eleven out of each thousand ships.

Seven yards produced 1613 of these vessels. None of these seven yards existed prior to 1941. Of the approximately 200,000 men employed at these yards, not over 10 per cent ever saw a shipyard or had anything to do with ships prior to 1941. Under such conditions it is a very remarkable achievement, practically unparalleled in the history of industry, to have produced so many ships in such a short time and have such a large percentage of them stick together under the terrific battering of old "devil" sea.

Any old-line shipbuilder with the most experienced help, who produced three cargo vessels a year for 33 years to owner's plans and specifications under owner's inspection force, and had two ships crack up at sea during that time, would think his record very good.

Several of these Liberty shipyards have produced over 200 cargo steamers in one year with practically no experienced help, and in so doing have turned a national crisis into a national triumph. Yet, when a small percent of semi-failure appears in ships built after this fashion, Congress has to investigate and proclaim this failure to the world.

There are two peculiarities in all of these crackings:

First, no weld breaks. The crack or failure is always in the metal of the plate. That proves that the welding work is good work and also that locked-up heat stresses are present in the plates that crack.

Second, these failures usually, if not always, take place when the vessel is coming home "light" and bucking a head wind. In such condition any Liberty takes a terrible pounding.

The real cure for locked-up heat stresses is to make up the ship structure in assemblies that can be heat-stress relieved in annealing ovens. This was the practice in several old experienced yards prior to the war. Such practice, however, is impossible with wartime schedules. It takes too much time and too many ovens.

The cure for the second factor is to provide deep ballast tanks in the design so that the ship, when coming home without cargo, could be properly trimmed and brought down in the water enough to avoid pounding, screw racing and other objectionable stresses and vibrations in the hull structure.

Much of the allegedly "new" shipbuilding technique has been repeatedly used by shipbuilders in the past when the necessity of the occasion demanded such procedure. Prefabrication and preassembly of iron and steel vessels was used in the first vessels built of iron. Building in dock basins is as old as the history of shipbuilding. It was used by the Phoenicians, the Carthaginians, and the Romans. King Solomon probably built his "navy of Ships at Engedi" in that manner.

There is nothing new or mysterious to the experienced shipbuilder in the methods used in producing Liberty ships. These methods have never before been used on such a vast scale, and to many inexperienced shipyard executives they, therefore, appear as new, and much credit is claimed for their introduction into the "almost dead old art of shipbuilding." We have deplored some of the wild and unwarranted publicity in this matter, even as we now more deeply deplore the shameful publicity being given to this very low percentage of partial failures.

The fact that these ships have been produced on such a scale so rapidly has led to many improved techniques in welding and other processes, and when these matters can all be sanely appraised for their application in constructive developments, we are sure that the Liberty effort will contribute in large measure to the improvement of the ancient and honorable art of shipbuilding.

DEVELOPMENT of STEEL and IRON SHIPBUILDING in AMERICA

By A. J. DICKIE

BUILDING IN BASINS

The following definition is taken from the "Universal Dictionary of the Marine, or a Copious Explanation of the Technical Terms and Phrases Employed in the Construction, Equipment, Furniture, Machinery Movements and Military Operations of a Ship." Edited by William Falconer; Published in London, 1789.

Lanch, is the movement by which a ship or boat desends from the shore, either when she is at first built, or at any time afterwards.

To facilitate the operation of lanching, and prevent any interruption therein, the ship is supported by two strong platforms, laid with a gradual inclination to the water, on the opposite sides of her keel, to which they are parallel. Upon the surface of this declivity are placed two corresponding ranges of planks, which compose the base of a frame called the cradle, whose upper-part envelopes the ship's bottom, whereto it is securely attached. Thus the lower surface of the cradle, conforming exactly to that of the frame below, lies flat upon it, lengthways, under the opposite side of the ship's bottom; and as the former is intended to slide downwards upon the latter, carrying the ship along with it, the planes or faces of both are well daubed with soap and tallow.

The necessary preparations for the lanch being made, all blocks and wedges, by which the ship was formerly supported, are driven out from under her keel, till her whole weight gradually subsides upon the platforms above described, which are accordingly called the ways. The shores and stanchions, by which she is retained upon the stocks till the period approaches for lanching, are at length cut away, and the screws applied to move her, if necessary. The motion usually begins on the instant when the shores are cut, and the ship slides downward along the ways, which are generally prolonged under the surface of the water, to a sufficient depth, to float her as soon as she arrives at the furthest end thereof.

The largest ship that ever was lanched in England, is the Britannia, of 100 guns, built at Portsmouth. Ships of the first rate are commonly constructed in dry docks, and afterwards floated out, by throwing open the floodgates, and suffering the tide to enter, as soon as they are finished.

IN OUR FIRST installment of this serial we recorded the start of iron shipbuilding in the United States in the year 1844. During that year the firm of Betts, Harlan & Hollingsworth of Wilmington, Delaware, built two small canal steamers and a larger ocean-going steamer, the Bangor, which was rather remarkable in that she had twin screw propulsion.

Also, during that year a large river steamer hull was built of iron by Robert L. Stevens of Hoboken, New Jersey. This steamer, the John Stevens, ran on the Delaware River for many years.

The type of iron construction used on these early vessels is shown diagrammatically in the drawing herewith, which was furnished us through the courtesy of William H. Collins, general manager of the Fore River plant of the Shipbuilding Division, Bethlehem Steel Company, Ltd. Note the fabricated plate keel, the flat bar frame and the clamps fastening the plates to the frames. The longitudinal seams between plate strakes were of course riveted, and the vertical seams between ends of plates were also riveted, probably with butt straps. This sketch is taken from the drawings of the steam tug Rescue, built by Harlan & Hollingsworth about 1858 for their own account and sold to the U. S. Government.

It was shown that these vessels, built 100 years ago or more, were prefabricated and partly preassembled in shops, then carted or barged down to tide water to be erected on building slips. They had to be built that way because no existing shipyards had any facilities for working iron plates and shapes. All the shipbuilding masters of that time were artists in wood, and they treated with great scorn the efforts of "mechanics and boiler makers" to produce seaworthy hulls.

A reader of the last installment has called our attention to the recent claims of some publicity experts that one of the great improvements made to the shipbuilding art by the present war effort is the building of hulls in basins or docks instead of on the ways in the "conventional fashion." That, of course, is nonsense to anyone who knows the history of shipbuilding, but since modern readers are always demanding documentary proof of statements, we submit herewith the definition of Launch or

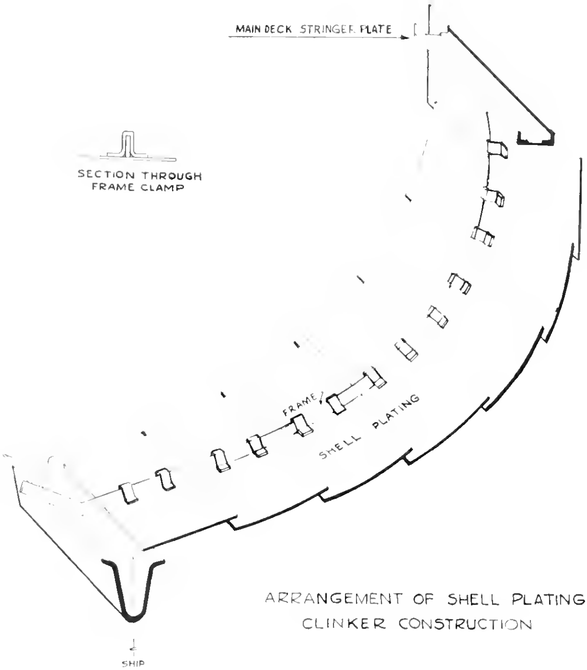
Lanch (as it was formerly spelled), taken from an eighteenth century marine dictionary.

In order to get the contemporary status of the shipbuilding art in America 100 years back, we should refresh our minds with a review of events and circumstances affecting that art during the eighteen-forties.

In 1844 James Knox Polk, known as "The Napoleon of the Stump," was traveling the countryside by stage and horseback, river steamer and train, in the whirlwind campaign that gained his election as president. The younger men of the farms of the older states were trekking West in Conestoga wagons. All the engineering brains and the artisan skill of the young nation was directed to transportation.

Henry Rossiter Worthington patented his direct-acting steam pump in July, 1844, after it had seen four years of service in a steam canal boat designed by its inventor for use on New York State barge canals. Steamboats were plying all the inland waterways from and including the Mississippi River system to the Atlantic.

In England the great engineer, Isambard Kingdom Brunel, produced the first transatlantic iron steamer in 1844. This vessel was well in advance of her times, like the Great Eastern, also designed by Brunel, which was soon to follow. S. S. Great Britain was 322 feet long, 51 feet beam, 32 feet, 6 inches depth, and was divided by watertight iron bulkheads into six compartments. While our description does not so state, we can assume from what we know of Brunel's designs that she had double bottoms, and if so, she would be up to modern

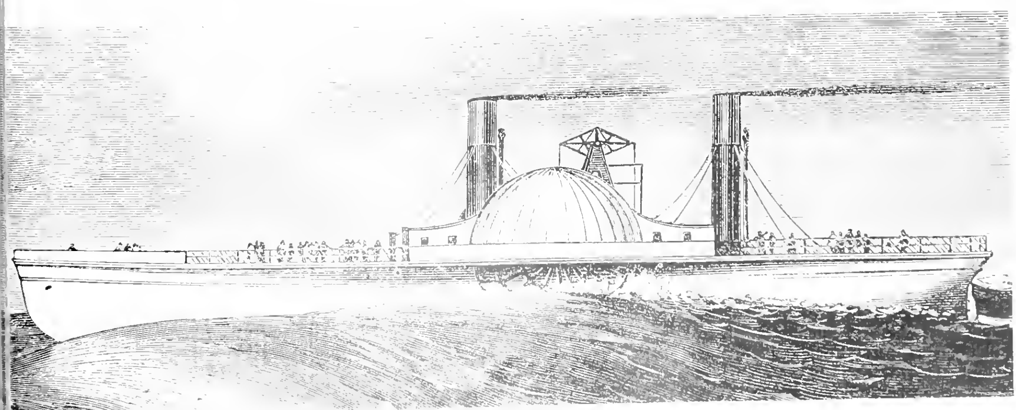


ARRANGEMENT OF SHELL PLATING
CLINKER CONSTRUCTION

TAKEN FROM DRAWING OF SS RESCUE

standards of safety as far as hull structure is concerned. As originally built, she had six masts carrying a good area of canvas, and was driven by an engine of 1000 nominal horsepower through a single screw propeller 51 feet, 6 inches in diameter. She never got into the trade for which she was designed, but was operated many years in the Aus-

Steomer W. L. Norris, proposed in 1854.



tralian trade, and also served as a British transport in the Crimean War.

The Cunard Line had been established in 1839, and began regular transatlantic service in 1840, under the official title, British and North American Royal Mail Steam Packet Company, with Boston as the American terminus. On the arrival of the Unicorn, their first steamer, at Boston, there was great enthusiasm, and the poet Longfellow "offered this beautiful sentiment: 'Steamships—the pillars of fire by night and cloud by day, which guide the wanderer over the sea.'" The wanderer who traveled in steamships those days needed some guidance; if you think otherwise, read the "American Notes" of Charles Dickens, who came over on the Britannia, first ship built for this service by Cunard.

In our year 1844, during the month of February, New England had one of the greatest freezes in its history. The entire harbor of Boston and its approaches were frozen over with solid ice, which imprisoned the Britannia and other ships. The Cunard Company appealed to the Boston Exchange, and at a cost of $10,000, a channel was cut in the ice, 100 feet wide, for 10 miles, to get the steamer out to sea. Her passage through this canal was accompanied by thousands of citizens on skates cheering and singing.

It is significant that 1844, the first year of iron shipbuilding in America, should also introduce the American clipper ship era.

Lieutenant Matthew Fontaine Maury of the United States Navy had just published the first of his famous wind rose charts, which showed the prevailing direction and force of the wind for each month over the surface of the world's oceans. He published also sailing directions which enabled the ship masters to find the wind. With this knowledge available, there came a great demand for fast ships, resulting in the marvelous sailing ship creations of that period.

At the same time that Harlan and Hollingsworth were struggling with the problem of iron [illegible]tion, the famous naval [illegible] W. Griffith, was laying [illegible] of the Rainbow, first [illegible] clippers. She was bu[illegible] Dimon of New Y[illegible] and Aspinwall, pred[illegible] American-Hawaiian St[illegible]

Donald McKay, 34 years old in 1844, was in partnership with a man named Pickett, building transatlantic packet ships at Newburyport, Massachusetts. In that year they built the Joshua Bates for Enoch Train of Boston. That energetic shipowner and merchant was so impressed with the ability of McKay that he made arrangements to finance a yard for him at East Boston, where he built many packets and all the fast clipper ships that made his name so famous.

At that period, the East River shore of Manhattan Island was almost a continuous shipyard, from Corlaers Hook to East 10th Street. The famous Webb yard between Fifth and Seventh Streets was then the great wood shipbuilding plant of the country. On the Delaware were many yards, and practically every port and river along the Atlantic Coast had one or more. Expert shipyard mechanics, after a seven-year apprenticeship, got $1.25 per day of 12 to 15 hours. Excellent ship timber was obtainable in great quantity and at less cost than anywhere else in the world. Mechanics to work iron, and iron itself, were less easily obtainable and more costly than was the case in Great Britain.

So America specialized in wood and achieved great glory in the maritime world for her wood sailing ship creations during the 15-year period immediately preceding the Civil War.

During that period, however, a very considerable amount of iron shipbuilding and marine engineering work was done by various yards, and that we shall cover in our next installment.

It was a period of great mental activity, and much of this activity gave birth to wild promotion schemes.

Here is one concerning a proposed new transatlantic steamer that was to cut in half the then record time across the ocean. It is culled from "Gleason's Pictorial" of March, 1854.

Steamer William Norris

"We have presented below a representation of the already famous steamer, the William Norris, which is expected to cross the Atlantic in six days! The prospective claims of this boat rest on some well-known natural Laws of water and motion, hitherto unapplied to the propelling of vessels. One of these is constructing vessels so that they shall Ride On water, instead of ploughing through it.

"We confess this proposition strikes us favorably!—if there is anything in it, there is everything. That, however, it is much more applicable to steam-propelled than wind-propelled vessels is obvious. It was natural that steam-vessels should at first be built after the general model of sail-vessels, yet we see no prima facie obstacle to prevent that flat-bottomed and prow-lifted shape from skimming over the water as rapidly and easily as its builder promises it will. The light draught of water of the William Norris, acting in concert with her unmistakable stability, will cause the waves to pass beneath, or, in other words, the vessel to pass above, consequent upon the easy bilge and diminished anterior resistance when the absolute resistance is less than the hydraulic pressure which sustains the wave; and by those who are familiar with the theory of waves, as practically demonstrated by nautical pursuits, this is at once assented to.

"Aside from her shape, she will possess more strength than any steamer now built, whether naval or mercantile; having iron keelsons and encasements for her engine and boilers within the wooden hull — the keelsons containing air-chambers and water-tanks—those parts designed to contain the engine and boilers are sufficiently buoyant to maintain them; and though the hull were filled with water the vessel could not sink, being itself sustained by the air-chambers, while the engine and boilers are supported by their own encasement, which removes the risk of foundering, whether occasioned by collision, by fire, or other accident, rendering her a life-boat on a large scale. But the chapter of improvement ends not here; her great longitudinal strength renders her capable of having her enormous power applied in the roughest weather, which equals one horse for each ton of vessel, while at the same time she will encounter nothing but spray, her shape being such as to render her lifting power on the anterior part quite commensurate with the power of her engine. She will measure 1267 tons, and if successful will be the wonder of the world. And we shall have whole fleets constructed after this model, thus bringing distant parts of the world still nearer and nearer to our very doors."

Marine Progress in 1943

by J. Lewis Luckenbach

Since my last annual report, there is a great deal on which to comment. Advances have been made in types of combatant ships, landing craft, etc., to better fit the war need. However, from the merchant marine standpoint, while some lessons may have been gained, from a strictly naval architectural standpoint, advances are not being made nor could they be expected while the country is at war and its entire attention is being focused on production. The Maritime Commission has met the necessity for more ships and the time of construction is constantly being lowered, fast approaching the minimum set by some of the first group of newly-established yards for the Liberty ships, where a little over 30 days is a fair average. Perhaps the only item worthy of comment in building is the increase in size of subassembly units.

Advances in machinery and propulsion units cannot be expected at this time, although the trend towards the higher steam pressures is established; as the industry becomes more acquainted with the use of higher pressures and temperatures, and as soon as conditions normalize, more radical advances in these fields may be expected. With the demand for higher speed which fits into modern transportation, higher horsepowers are required. Many new devices and materials have been brought out through the war, and some of these with time and a readjustment period will probably lend to advancements in construction, engineering and navigation.

We have many types of ships, most of which will require some conversion, depending on the trade in which they are to be used. Some of these conversions will be extensive and will make considerable employment in the repair yards of the country.

The author is president of the American Bureau of Shipping. Text is an extract from a report to the 82nd annual meeting of the Board of Managers and Members of the Bureau, made on February at New York.

The Merchant Fleet

Our present expanded merchant fleet, together with ships of the Victory and other diversified types projected by the various steamship companies, with the encouragement of our Government, ensures a merchant marine second to none; one that will bring our commerce to every port of the world and expand our trade.

Our Government has spent vast sums in the building of a Navy, the largest in the world, for the purpose of the winning of this war and the guaranty of a lasting peace thereafter. If this Navy is to be maintained, a comparable merchant marine must also be maintained or else the heavy costs in blood and dollars will be to no avail. While we may hope for no recurrences, the best insurance against war is the maintenance of a large Navy and the establishment of a permanently expanded merchant marine with an adequate, thoroughly trained personnel. The merchant marine should be such as to make the life of the seagoing personnel a desirable one and a profession of pride, as well as equally remunerative to those offered on land. A well-thought-out plan should be adopted so that the young men now being trained will make the sea a permanent profession, which in turn will help to expand our foreign commerce.

Our seagoing merchant marine should be more than adequate to serve as an auxiliary for the armed forces. Commerce cannot be stopped in time of war, and without adequate replacements ready at hand the country would suffer. It is indeed fortunate that due to the foresight of the Maritime Commission we had an opportunity to prepare and develop our shipbuilding industry. The construction of a new yard and the delivery of its first ship consumes about a year. A war might be lost or won in this period.

J. Lewis Luckenbach

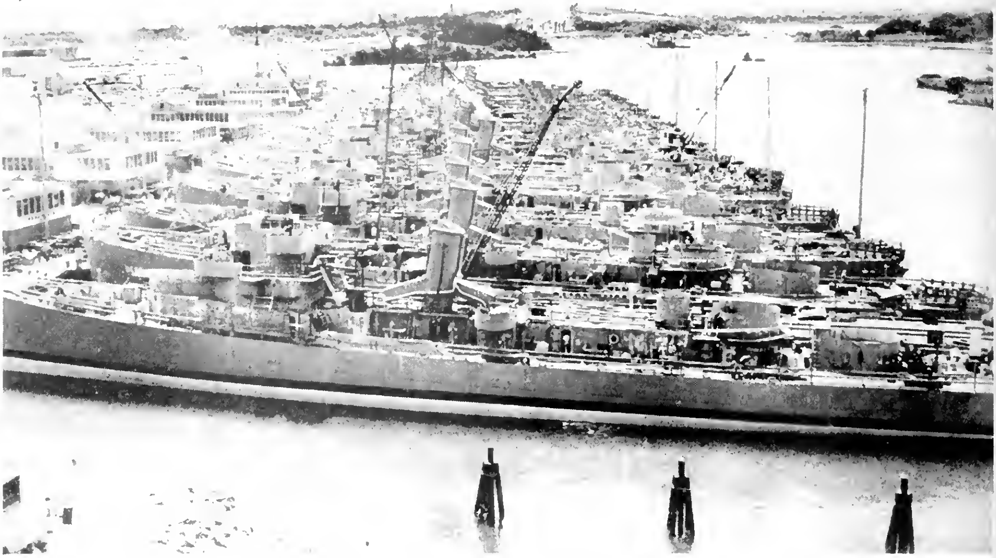
The Victory Ship

A notable step forward on the part of the Maritime Commission is the adoption of the newly-designed, highly-powered and faster Victory ship, which will not only answer the purposes of war and speed up its conclusion but will also serve as an added increment to a modern merchant marine at the conclusion of the war—a vessel which should be able to compete, given equal opportunity, with any vessels that may be produced abroad.

The running of a country in wartime of necessity makes the armed forces, under whose protection and for whose service the merchant marine is operated, the governing controlling factor. In times of peace, the functions of the merchant marine should again return in their entirety, or at least as far as possible, to private ownership and private operation. With this operation, the Government should dissassociate itself as far as practicable, maintaining the necessary safeguards to safety at sea, but permitting private enterprise to perform its task to the utmost. Foreign countries which have succeeded in establishing a merchant marine have adhered to this policy, and the making of an industry responsible for its operation, instead of this activity being absorbed by a Government, is the best manner in which a finer merchant marine can be established.

The national classification society sets standards produced by the best

(Continued on page 112)



Several turbine-electric-drive destroyer escort vessels being built in the shipyard of the Bethlehem-Hingham Shipbuilding Co.

1943 Marine Activity

by J. W. Belanger

THE WORLD'S mightiest Navy. The greatest merchant fleet afloat. 1943 brought both of these distinctions to the United States as equipment and material flowed from shop to shipyard at an unprecedented rate and down the ways in the form of thousands of vessels. The surface fleet, according to the Navy Department, grew to more than 14,000 ships with a combined tonnage of almost five million tons. Tonnage of tankers and ocean-going merchant vessels jumped to the neighborhood of 35,000,000 tons.

Thus shipbuilding, in the second year after Pearl Harbor, really hit its stride, a stride that boosted it to one of the nation's foremost industries, and one that had and will continue to have a far-reaching [illegible] the many component industries involved.

General Electric, for example, produced a greater variety of marine equipment than any other single manufacturer, representing a sizable share of its total 1943 volume. From company turbine plants located in four cities, propulsion equipments were being shipped at a rate far ahead of schedule. Vessels for which the propulsion sets were furnished have from one to four screws. In terms of single screw ships, the 1943 production rate was enough to send one G-E turbine-driven hull down the ways every eight hours. Total horsepower of propulsion turbines built during the year by the company was 11,170,000.

Production of propulsion turbines for destroyers alone was stepped up to more than 2½ times that of 1942. Turbine - electric propulsion equipment for tankers shipped in 1943 amounted to nearly 900,000 horsepower, three times 1942 output. Likewise the 1943 output of merchant ship propulsion turbines for use with reduction gears was approximately 1,000,000 horsepower, more than four times that of the preceding year. Merchant ship reduction gears were produced for nearly 900,000 horsepower of propulsion equipment, more than double the 1942 output. Incidentally, approximately 50 per cent of the merchant ship propulsion equipment production was shipped to the Pacific Coast, attesting to the increasing prominence of the West in the shipbuilding industry.

The production story was much the same for other equipment. More than 1½ million horsepower in motors for auxiliary drives on Navy and merchant ships was supplied. Switchgear, transformers, cable and other related apparatus, as well as a wide

(The author is manager, Fede[illegible] sions, General Electric Company.)

assortment of actual combat equipment, was produced in record quantities to meet requirements.

Significant from a post-war standpoint is the fact that cost went down as production went up. Destroyer propulsion equipment, consisting of two turbines for gear drive, was being furnished in 1943 at a cost one-third less than the amount for the same equipment in 1939, despite the essential employment and training of thousands of inexperienced workers.

G-E turbines will power 49 per cent of the destroyer escorts. More than a third of the entire DE fleet will be propelled by G-E turbine-electric drive. In 1943, nearly 2,000,000 horsepower of such propulsion equipment for destroyer escorts had been produced at four of the company's new plants. Also supplied were the propulsion motors, auxiliary turbine-generator sets, excitation motor-generator sets, main propulsion control, and main and auxiliary ship's service switchboards.

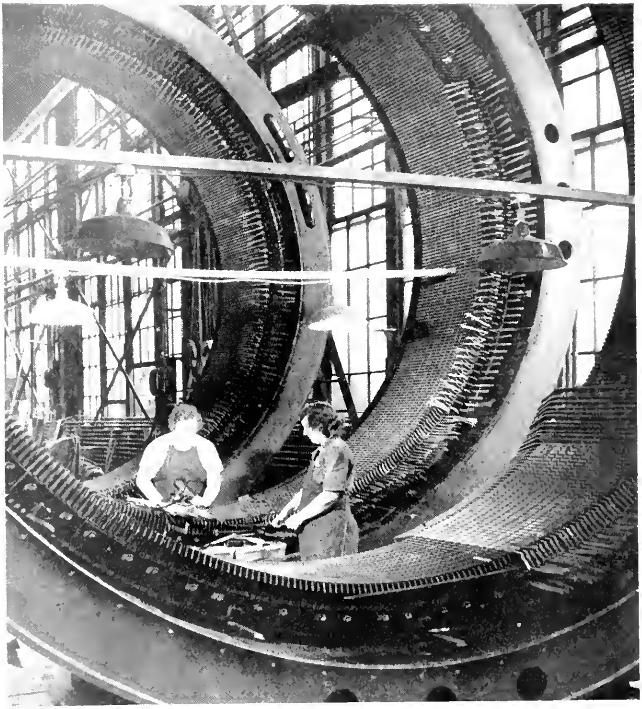
Diesel-Electric

Horsepower of diesel-electric propulsion equipment shipped in 1943 was 62 per cent greater than in 1942, a record amount in this type of equipment. Shipments of equipment for submarines in 1943 represented a 300 per cent increase over 1941. Non-combatant vessels for which diesel-electric propulsion equipments were supplied included mine sweepers, net tenders, salvage craft, gasoline tankers, and fleet and harbor tugs.

Training Personnel

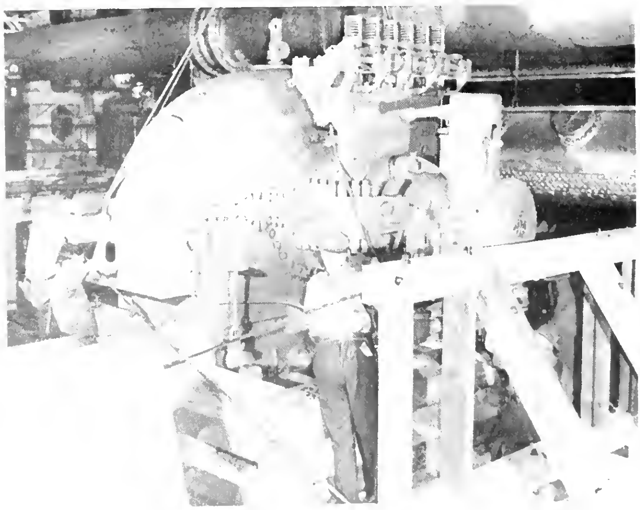
In cooperation with the Navy and the Maritime Commission, the company has conducted a number of special training schools. One of the most important of these is at the Syracuse plant, where more than 1200 officers and men were schooled in the operation and maintenance of destroyer-escort turbine-electric propulsion sets. A complete destroyer escort engine room erected in the plant and officially christened the U.S.S. Knox, facilitates instruction. The Navy men attend classes during the day. At night the same facilities are used for U. S. Maritime Service men being assigned to turbine-electric tankers.

Other instruction was given in the care and operation of submarine propulsion equipment and gunfire control. In addition to training men for the U. S. Navy and merchant fleet, the company gave instruction to a number of British personnel.



Propulsion motors for some cargo ships were produced in the power transformer shop at G-E's Pittsfield Works. These two women are inserting coils in the stators.

Propulsion turbine for a high-speed tanker being lowered onto flatcar for shipment.



"O. C.'s" lined up for inspection in front of barracks at Alameda Officers' School.

OFFICERS' SCHOOL at Alameda

Commander Malcolm C. Crossman, Superintendent of the School.

ON THE EAST side of San Francisco Bay, where once stood a bathing resort called Neptune Beach, the War Shipping Administration has established a training station to develop officers for the United States Maritime Service.

It is called the U. S. Maritime Service Officers' School, and the students are known as Officer Candidates. The name of the school and the title of O. C. gives a ready explanation of why the school was established. The superintendent is Commander Malcolm C. Crossman, USNR.

The Officer Candidates are there to win their gold braid—to become officers in the great Victory Fleet. They are stationed on a large base by the water's edge, just 14 miles from San Francisco, and three miles from the city of Oakland.

The O. C.'s have liberty hours to visit these cities, but for the most part their life is spent on the station with living quarters in the barracks, chow in the mess hall, classes in the deck and engineering buildings, and

many extra curricular activities to keep them busy.

And busy is the only word that applies to this base. It's the general opinion that they are spending the busiest four months of schooling in their lives.

To understand this base, it is necessary to go into the qualifications of the Officer Candidates in the Maritime Service. The requisite entrance is at least fourteen months' sea time. And the beginning of this phase of training actually starts when a man contacts one of the enrolling offices established all over the country.

After a tentative approval from Headquarters, he is given a physical examination, sworn in, and assigned to the base with a temporary rating, and the pay, of a Chief Petty Officer.

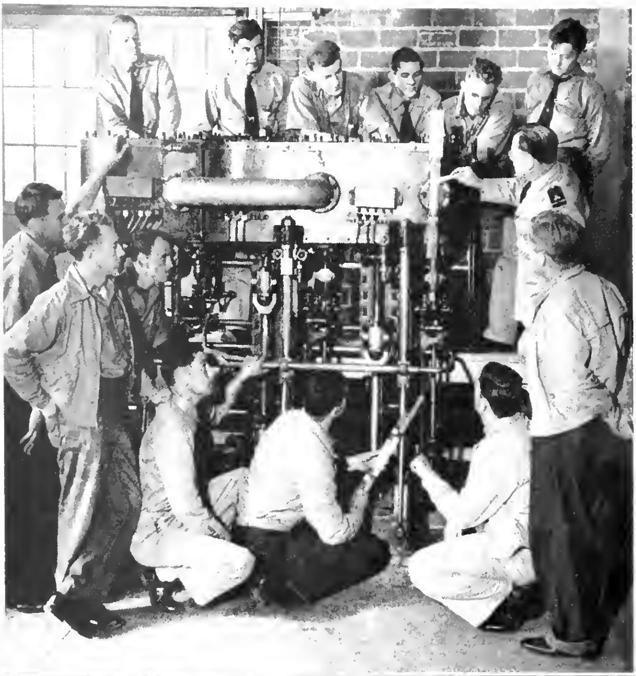
The first day is hectic. As soon as he comes through the gate, the Personnel Office takes him in hand. He is "processed" and put "in jackets." This simply means a matter of having personal history forms filled out and sea time checked again. A jacket is what O. C.'s call the file in which these records are kept.

Next comes a visit to the I. D. (Identification) Room, for pictures, fingerprinting, and a check of health records by a Sick Bay representative.

Then the O. C.'s are assigned to their barracks—four to each spacious room, equipped with individual lockers, tables, lamps, and ship-style bunks. They are issued bedding and spend a portion of their time moving in and meeting new room-mates of the next four months.

First Day

On the first day, the new enrollees learn what is in store for them. They are sent to the library and come back loaded down with armfuls of books, signal flags, mechanical drawing sets and other equipment. Then they change from civilian clothes to the



Above: Learning about reciprocating steam engine valve settings.

Right: A problem in navigation for the deck officers.

(United States Maritime Service official photo)

distinctive uniform of the Maritime Service.

O. C.'s are sent to Sick Bay for general examinations, inoculations and dental examinations. They are given four separate tests by the training office, in order that they may be assigned correctly in classes. There are meetings of the departments—deck and engineering—in which the senior instructors welcome and give the new men an idea of what to expect in the way of instruction and where to go for help.

In their first spare hours they are given mathematics instruction, see a few training films, and become generally acclimated to the station by looking in on the chaplains, the Ship's Service Store, the barber, the dock, the tailor shop, gymnasium, recreation rooms, movies, entertainments, lifeboat basin and a hundred other places "aboard ship."

Typical Day

A typical day begins at 6:30 a.m., when the reveille bell rings. Rooms are cleaned, breakfast is eaten, and the O. C.'s are ready for classes at 8:00 a.m.

From 8 to noon it is class work followed by the welcome chow call. At 1 p.m. it's back to the books, and somewhere between 4 and 4:30 classes are dismissed—and homework begins.

The evening meal is ready after 4:30. Liberty for those who rate it begins at 5 p.m., but there are other nights when the O. C. has "duty." Except for an emergency such as a fire, "duty" means study—and that's just what is done.

Actually, the O. C. has the run of the station, which means he may choose up sides for a game of softball outdoors or basketball indoors, do some boating down at the docks, see a movie, have a late cup of coffee at the soda bar, take out a book from the fiction library, go for a dip in the lifeboat basin, or just gather in any convenient corner and dish out "scuttlebutt." But it can't be emphasized too much that the O. C. is at Alameda to study, and most of his time goes deep into textbooks.

Deck Officers' Course

Take a deck O. C., for instance. His subjects are navigation, transportation and handling of cargo, seamanship and ship handling, [illegible] communications and signaling, marine inspection rules, rules of the road, ship construction and [illegible] knowledge, boat handling, first aid and ship sanitation, water safety, and mathematics. Visual education is an important part of each study day.

In the first month the instructors, who have all been to sea and know the answers, ground the men in geonavigation or piloting, give refreshers in math, test the men for swimming ability, and give pointers on what to study.

The second month deals with the different methods of sailing—plane sailing, parallel sailing, middle latitude, Mercator, and traverse. Meanwhile, all the nautical sciences are pressed home.

In the third month the instructors bear down on Celo-Nav, or navigation by the planetary system. Meanwhile, all the nautical sciences are placed before the O. C.'s.

In the fourth month there is a complete review, after which the men "sit for licenses" before the Coast Guard's Merchant Marine inspectors. Most of the graduates take examinations for Third Mate. Some have enough sea time to qualify for Second Mate or First Mate.

And this is no wonder, for the men at Alameda are already experienced seamen. Although fourteen months of ocean-going time is required for entrance, there are some who can count up to forty years of ocean sailing.

The average age of the men is between 25 and 29 years.

O. C.'s for Engine Room

O. C.'s in the engine department discover immediately that mathematics is no longer theory, but practical. It's said that math is 76 per cent of an engineer's knowledge, and the instructors bear down heavily from the start. In his first month, in addition to math, the engineering O. C.'s are introduced to elementary physics and chemistry as applied to thermodynamics and boiler feed-water treatment. There is also a study of stresses and elements of metals.

In the second month, the preliminary study is applied to the basic principles of boilers, turbines, reciprocating engines, diesels, engine room auxiliaries, and regrigeration. Meanwhile, they're still bearing down on math.

In the third month, there is a practical application of thermo-dynamics, using marine equipment. In the fourth month, there is a continuation of study as well as review. Meanwhile, the engineers also have machine shop, welding, boating, swimming and first aid on the curriculum.

And after four months, they too sit for their licenses to qualify as Third Assistant Engineers, or if their sea time justifies it, Second or First Assistant Engineers.

Practical Demonstrations

The United States Maritime Service Officers' School at Alameda is more than classrooms. For practical application of their studies, the officer candidates have the dock where boats are berthed. Actual sea conditions may be simulated here, such as going alongside a ship, or hoisting with the various types of davits. They have a full-sized mast, the same as would be found on a cargo vessel, with booms and winches to aid in the teaching of cargo handling. They have a real barrage balloon, the kind now in use on merchant ships to ward off enemy planes.

The seamanship building includes a night vision room, which has a moving platform accommodating 30 men at a time. Students learn to pick out the silhouette of a ship by a flash of gunfire, lightning, starshells or flares, or by the reflection of fire from another ship. Of course, these lights must be simulated. The night vision room is also equipped with blinker lights for signal practice. Here O. C.'s are taught some of the tricks in acquiring the best night acuity of vision.

Boats are also stored in the seamanship building, and as any sailor loves his ropes, this is a popular place.

Engineering Lab

The engineers have, for training purposes, four diesel engines in operating order, including one 200-horsepower engine, with waterbrakes and resistance. They also have cutaway models that operate. There is the turbine lab, with various types of bladings, nozzle blocks and photos. In the boiler room there is an extensive feedwater course for testing boiler water, and various exhibits of actual boiler failure.

The base also boasts reciprocating engines, including a triple expansion marine steam engine and steam to operate it. There are also various engine parts for demonstrations. And in the Engineering Building are a dozen lathes, power saws and milling machines. The heating plant of the station is used to demonstrate boiler

Explaining some navigational complexities.

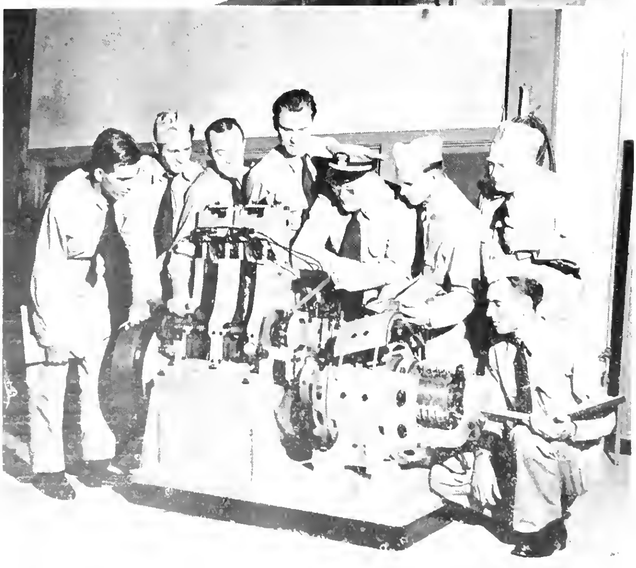
efficiencies, and includes water meters, oil meters and gas analysis kits.

Back of all this—the station, the studies, and even the O. C.'s spare time—is the dominant thought that they have a burning reason to be there. Many of the students have already experienced the threat and the fact of enemy torpedoes. Their shipmates are even now delivering tremendous supplies of men and munitions to every fighting front. While their pals are doing this job now, the officer candidates at Alameda are preparing to man the new ships sliding down the ways at the rate of four and five a day.

It will be a responsible and important task for them to be watch officers for the first time, or in charge of engines below. They will have in their care the ship itself with its millions of dollars in war cargo, as well as the priceless lives of their shipmates.

They will transport tanks, guns, planes and ammunition. Or it may be coffee, sugar, beef, books. Even more important, they may transport Uncle Sam's fighting men to the front.

Through all these complexities, the officer candidates of the United States Maritime Service are fulfilling the duties of a proud profession. In war or in peace—they will deliver



"Getting under the skin" of a generating set.

Automatic Welding of Pipe Flanges

by Frank L. Alexander, Leo Hunt and John Logan

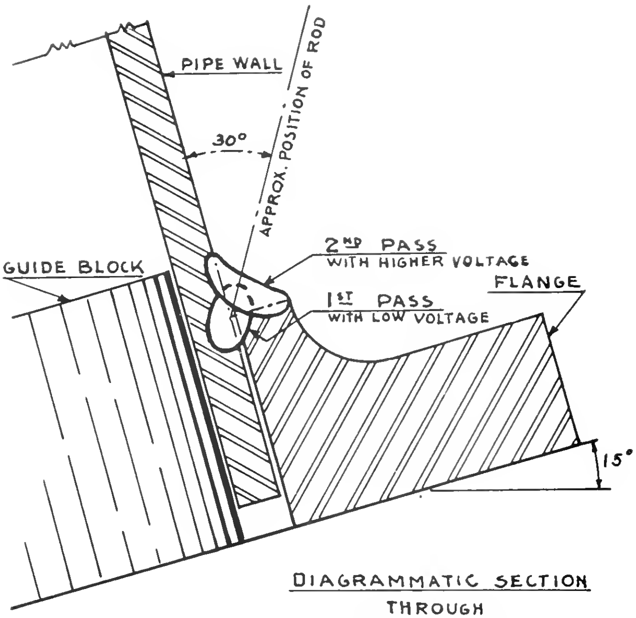
IN THE PAST practically all welding on pipe flanges from the 2″ to 12″ size has been done manually, entailing an enormous amount of man hours and expense. By applying the Submerged Melt Process ("Union Melt") and properly positioning and turning the pipe, the cost in man hours is cut to a minimum, and the resulting weld is, in most cases, far superior and more consistent than the manual weld.

(Mr. Alexander is pipe welding superintendent; Mr. Hunt is Union Melt superintendent; and Mr. Logan is outfitting engineer. All are with Permanente Metals Corporation, Richmond Shipyard No. 1, Richmond, Calif.)

The Submerged Melt Process ("Union Melt") of welding has been evolved and brought to a satisfactory degree of perfection through numerous past experiments and studies. It was natural, therefore, that in seeking a faster method of welding pipe flanges this process suggested itself. There were many difficulties and obstacles, such as curvature of surface, unequal thickness of material, trapped dirt and grease, etc. However, one by one these were overcome, until now the operation is very successful.

Exhaustive trials and tests were conducted and witnessed by the Maritime Commission, American Bureau of Shipping, and Coast Guard officials of Yard Number One, and the results of these tests would indicate that approval from these bodies can be obtained. A fillet weld was made on a slip-on flange and the pipe was blanked off inside about 6″ from the weld. The flange was then supported on its outer rim and a plunger was inserted in the pipe against the blank. Pressure was then exerted on the plunger to the point of failure. In every case the pipe failed, and not the weld. All welds made in production work and passed by visual inspection have passed all hydrostatic tests 100 per cent, which is a very important feature.

From numerous experiments and tests the conclusion has been reached that two-pass welds are the best for pipe flanges. The first pass should be run with fairly low voltage causing deep penetration at the root, then on the second pass the voltage is raised, causing the weld to flatten out and making a good-looking, as well as an ideally shaped, coverpass.



DIAGRAMMATIC SECTION
THROUGH
2 PASS FILLET WELD

The pipe is positioned and turned through the use of a machine made for positioning work for welding. A "Union Melt" S head, redesigned by the automatic welding personnel of Yard Number One, is being used. A major change in this S head from the standard is a control box made here that eliminates the thyron tubes which will not function accurately on low amperage ranges. Through the use of this box the rod feed is controlled by the arc voltage, which in turn is determined by the length of the arc. If there is any variation

in the amperage, the arc length will start to change, causing the rod feed motor to speed up or slow down, thereby maintaining a uniform arc.

The "Union Melt" head is mounted on the unit so as to have latitude enough to compensate for different diameters of pipe. The electrode is then pointed and set in the apex of the fillet formed by the pipe and the flange. The rotation is started simultaneously with the arc, and as soon as the weld has progressed a few inches the excess weld melt is picked up with a vacuum. The solidified slag can then be removed easily before the rotation reaches the starting point and the second pass may be put on without stopping.

As the work is being done now, we have an operator and a helper running the machine. The helper cleans the fillet with a wire brush preparatory to welding, checks the supply of flux in the feed hopper, and uses the vacuum to remove excess flux. The operator controls the settings, voltage, amperage, and speed of travel. The flange is positioned about 15° off horizontal. This makes a natural vee for the downhand weld. The rod is pointed directly at the apex of the pipe and flange, and is approximately 15° off vertical, making an angle of 30° with the axis of the pipe. The flux is fed through a specially-designed tube encircling the lower part of the buss-extension, allowing the flux to be laid around the arc. This method controls the flux in a small area and deposits it evenly, thereby avoiding any of it falling off too soon due to the curvature of the work. Most of this flux is picked up by the vacuum and used over, as in plate welding.

We are using a coarse "Union Melt" flux (12x200) and find that it is very good for our work, inasmuch as it is a low amperage flux and solidifies quickly, helping to keep the weld melt in place until it cools sufficiently to keep from running off. Excellent results have been obtained using "Union Melt" #36 rod 3/16" in diameter. This is a good size for all flanges from 2" to 8".

By using the solid type of back-up block (steel) a dual purpose is served. It centers the pipe and flange and also acts as a chill bar to avoid burning through in the event of too much heat. The table herewith is an approximation of the settings being used at the present time. The source of power being used is D.C.

Pipe Size	Travel One Revolution		Amperage	Voltage 1st Pass	Voltage 2nd Pass
2"	20-30	seconds	275-350	28-32	None
3"	25-35	"	350-425	28-32	None
4"	35-45	"	425-500	25-30	30-35
5"	45-55	"	475-550	25-30	30-35
6"	55-65	"	500-600	25-30	30-35
8"	65-75	"	550-650	25-30	30-35

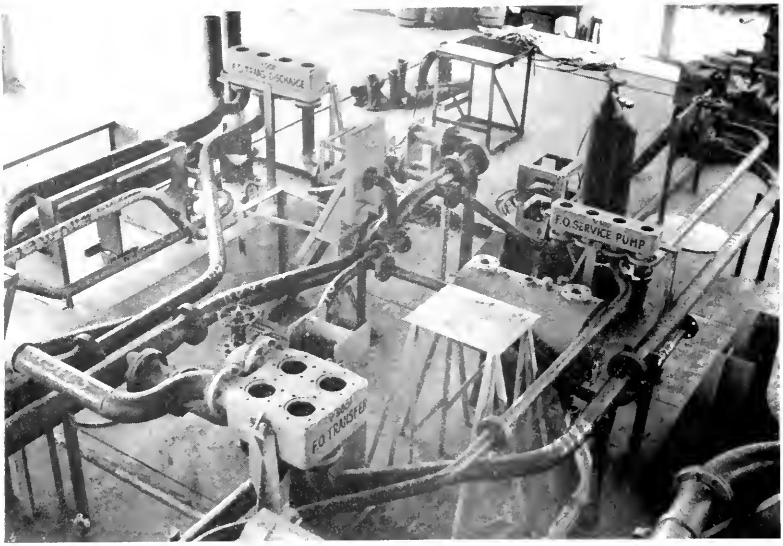
Settings used in automatic welding of pipe flanges.

Welds made in this fashion have been about 99 per cent perfect, the only thing stopping 100 per cent perfection being poor fit-up or irregularity in the pipe or flange. Poor fit-up is caused sometimes by the flange being put too close to a bend where the pipe has been flattened on one side in the bending machine, or an oversize flange with all the spacing being left on one side.

The limitations at present consist of galvanized pipe and pipe too crooked to be turned on the positioner. In welding galvanized pipe the escaping gases disrupt the melt to the extent that it is impossible to obtain a passable weld. However, various experiments are under way and undoubtedly a way of overcoming this will be found.

Further experiments are being conducted in applying this method of welding to butt welds. Reasonably satisfactory results have been obtained on these butt welds, and this method probably will be in production shortly.

Welding positioner and Union Melt welding head and flux distributor as arranged by Richmond shipyards for welding pipe flanges.



View of aft portside mock engine room showing manifolds and pump jigs.

Exact Prefabrication Of Pipe Systems

by Arthur J. Andersen

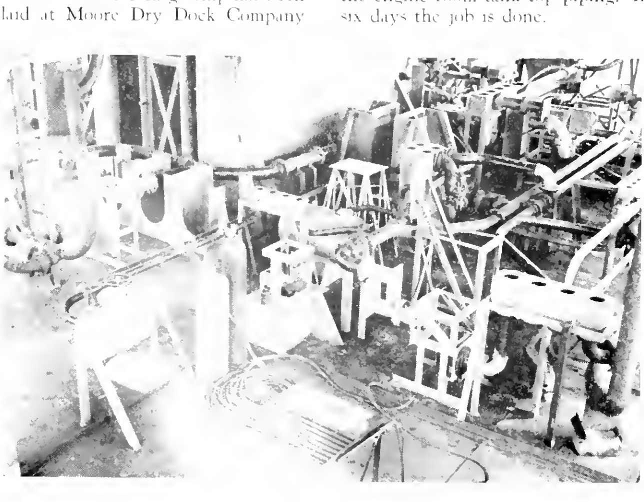
TWENTY DAYS after the keel of a C-2 cargo ship has been laid at Moore Dry Dock Company in Oakland, California, a crew of expert pipefitters go aboard to install the engine room tank top piping. In six days the job is done.

Before this new Moore method of pipe prefabrication had been evolved, the pipe installation work required nearly two months and approximately 5600 man hours. Now the pipe is manufactured and installed in less than a quarter of the time, in approximately 1250 man hours. The manufacture and prefabrication of the piping requires 950 man hours and installations require about 290 man hours. All of the work is performed by a crew of six pipefitters, four helpers, five welders and two burners.

To facilitate the pipe prefabrication, a mock-up has been laid out to the exact floor plan of an engine room, with all of the structural marks exactly as they occur on the vessel, taking into consideration all structural obstructions such as deck columns, shaft bearings, turbine gear foundations, manholes, and so forth. In fact, the model turbine gear foundation serves a dual purpose as a mock-up and as a tool house for the mock engine room.

Eight complete pipe systems for each ship are fabricated in the mock engine room and each pipe system is designated by a different color. Every pipe, accurate in all measurements, has its own special number.

(The author is Director of Systems and Methods, Moore Dry Dock Company.)



Looking toward forward center of mock engine room. Wooden structure represents outer dimensions of main gear foundation which is utilized as a stock room.

Thus if a pipe should burst while the ship is at sea, the number of the pipe could be radioed to the company and a new piece of piping the exact duplicate of the damaged one could be promptly fabricated and forwarded to the damaged ship's nearest port of call.

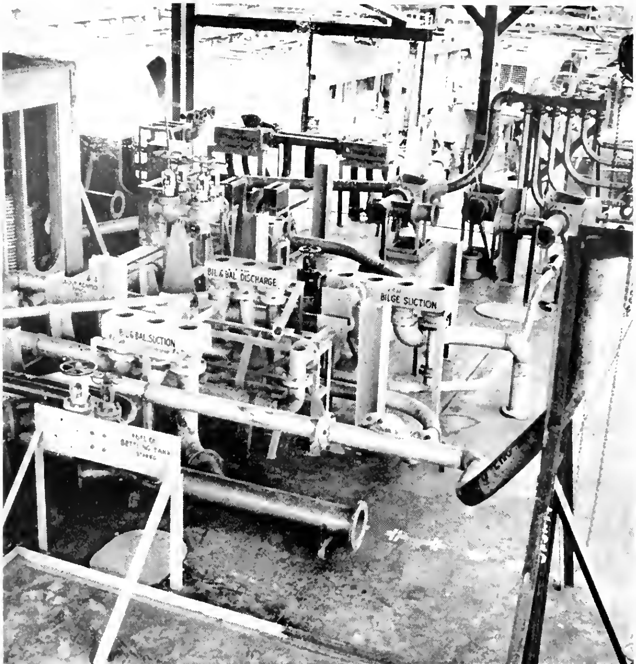
The piping, after being bent in the pipe shop, is sent to the mock engine room according to a regular schedule. There it is fitted, marked, tested and sandblasted. It is then ready for installation on a new hull in keeping with the ship's building schedule. The piping is sent to the engine room complete with nuts, bolts and gaskets. Even the flanges are marked for position. Everything is made up according to exact sizes and scales. There is no guesswork. So effective is the new system that now deckhouse piping is being fabricated. The same mock-up room, with additional jigs, is being used for the deckhouse piping work.

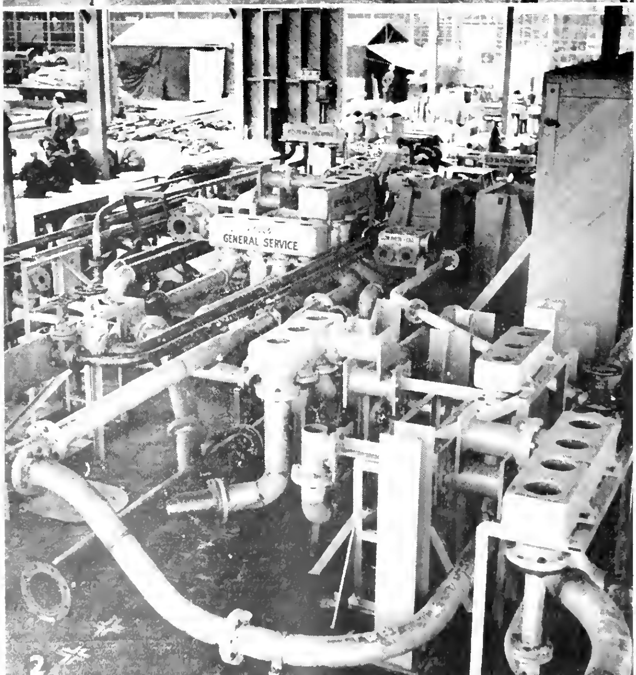
The layout work in the mock engine room has a definite procedure, beginning with three main pipe lines—bilge, ballast and fuel oil transfer. Like a jigsaw puzzle, they are the "key," and from them the entire piping system from the engine room is laid out.

This procedure is the result of months of study by the Moore Department of Systems and Methods. In order to meet exacting requirements of the U. S. Maritime Commission, and to make sure that the conditions in the mock up engine room exactly reproduced those on the ship, it was necessary to devise a method of spotting machinery foundations in the hull with exact relation to certain fixed lines which would not vary with respect to the engine room space. The ship's fore and aft center line and an engine room thwartship bulkhead were chosen as base lines, and all machinery positions are laid out by surveyors in each hull in exactly the same relation to these two lines.

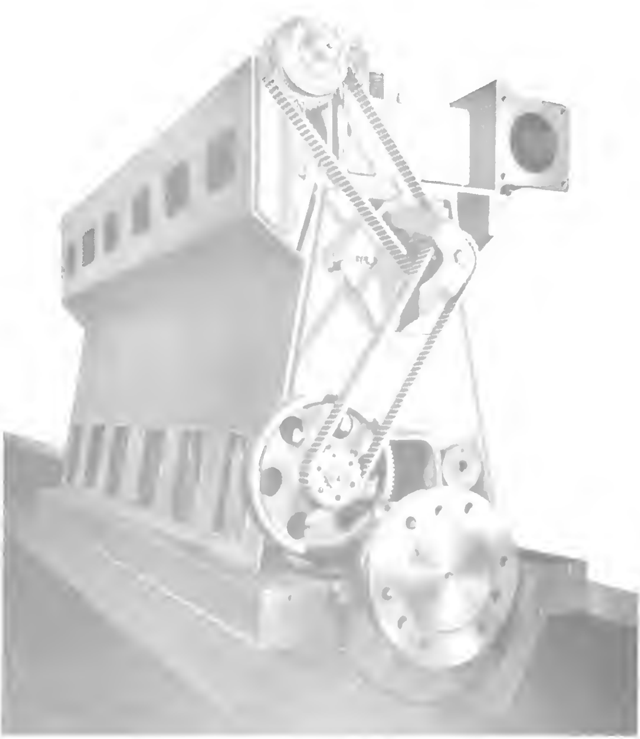
When, therefore, the mock ups are similarly exactly placed in the mock engine room and pipe systems exactly fitted to these mock-ups, those pipe systems exactly fit in their places in the actual engine room on board ship.

The results have been tremendous savings in man hours and money, and the entire shipbuilding schedule has been advanced.





New



End view with end plate removed, showing chain drive for camshaft.

THE NEW SERIES 50 diesels, recently introduced by Joshua Hendy Iron Works, incorporate into one model a wide range of modern design features that contribute to dependability in heavy-duty stationary and marine services.

Hendy diesels are 4-cycle, with a bore of 12″ and stroke of 15″, and are normally rated at 83.3 hp per cylinder at 500 rpm.

The design of the new diesels reflects years of research and development by the corps of company power-plant engineers, who combine long experience on other prime movers produced by this company with similar experience in stationary and marine diesel fields. Precision workmanship and tremendous plant facilities, such as required for volume production of turbines and large reduction gears, were available for the manufacture of diesels.

Unit-type fuel pumps and injectors combine with overhead camshaft to reduce the number of working parts. The valve and rocker-arm design insures valve seating without side thrust on the valve stems, and reduces valve adjustments in service.

Unit fuel injectors for each cylinder eliminate the need for long, high-pressure fuel lines between the injection pump and the nozzle. Higher pressures which improve atomization are thus possible. The entire pump and nozzle unit can be quickly and easily removed for cleaning, if necessary.

Efficiency is further advanced by the use of dual alloy-steel intake and exhaust valves. Smaller valve diameters and closer volumetric control are achieved with the dual valves. Valves operate at lower temperatures, which increases their service life and saves grinding. The large valve area reduces velocity through the openings and further reduces valve maintenance. The valves operate in removable guides.

Heads are cast from Meehanite with large water passages for cooling of valve guides, injector and valves. Dead water spaces are eliminated by jet action which directs cooling water to points of highest potential temperature.

Rocker arms bear on positive-acting, slotted cross heads or dividers so that pressure is evenly distributed on the dual intake and exhaust valves and side thrust is eliminated. This helps insure positive seating and increases the life of valve stems and guides. Valve action is further controlled by hydraulic tappets that automatically take up clearance so that the action is quiet and positive.

An integral feature of the head-assembly design is the overhead camshaft, which eliminates long push rods, reduces weight and results in a rigid, positive valve action. The camshaft is 3″ diameter ground steel, and is fitted with forged and case-hardened steel cams, keyed to shaft. Camshaft bearings are force-feed lubricated through drilled holes. In reversing-type engines the cam-shaft is moved axially by a pneumatic cylinder.

Both engine bed and cylinder block are of welded steel construction. The heavily ribbed, deep sections of the bed provide extreme rigidity for crankshaft bearings.

On marine models, reversible-type centrifugal pumps circulate raw and fresh cooling waters. Tube-type cooling-water heat exchangers, with fresh and raw water pumps and complete piping, are integral parts of Hendy diesels. In this way salt-water corrosion is eliminated and more efficient operating temperatures are maintained. The water-cooled exhaust manifolds on both marine and stationary types are fabricated from welded steel tubing. Pyrometer thermocouples are located at the lower sides of each exhaust outlet. Cylinder-head water thermometers are also provided. The sectional views herewith show the large water passages and their design to get high-velocity circulation at points of high temperature.

The large-diameter crankshaft may be either a solid steel forging or a hollow alloy casting, each exceeding the requirements of the American

Hendy SERIES 50 *Diesel*

Bureau of Shipping. The forged steel crankshafts are drilled for force-feed lubrication to connection-rod and wrist-pin bearings. Alloy cast crankshafts are for lubrication to rod and pin bearings.

By a unique design, full bearing area is obtained on the upper side of the connecting rod and lower part of main bearings. The main bearings are centrifugally cast, babbitt-lined, steel-backed type. Each bearing is easily removed without disturbing crankshaft or other bearing caps. The center main bearing is 6⅝" long, with others 4⅝" long. All are 9" diameter.

Two main bearings are located at the flywheel end of the crankshaft. Between them is the camshaft and governor driving gear. The camshaft drive chain is in two sections, of which the first connects the driving sprocket and the shaft of the chain-adjustment assembly, and the second goes from the chain-adjustment assembly to the camshaft. Uniform tension can be maintained without altering timing.

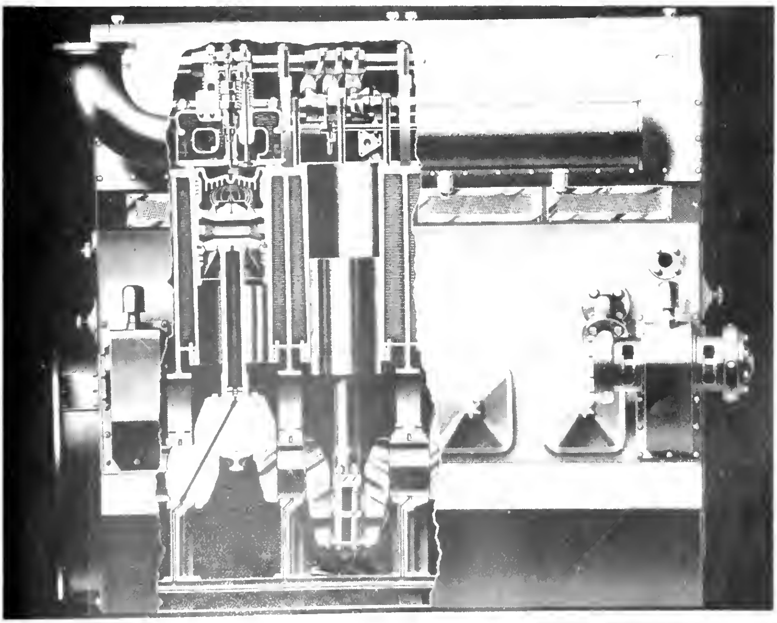
Oil cooling reduces the weight and operating temperatures of light-weight cast Meehanite pistons, which contributes to longer ring and liner service and reduced oil consumption. Pistons have deep ribbing on the underside of the head. Bronze wrist-pin bushings are pressed into pistons.

Connection rods are forged steel, with wrist-pin ends fitted with removable hard-alloy bronze bushings. Crankshaft ends have removable split babbitt-lined bearings. Caps are held to the rods by four alloy steel bolts. Rods are drilled for force-feed lubrication of wrist pins and to provide the oil for piston cooling.

Full pressure lubrication is used with a scavenging pump to remove oil from the crankcase to an external reservoir, and a separate pressure pump to supply oil from this tank through a header to the main bearings and through the drilled crankshaft to rod bearings and pistons. Camshafts, rocker arms, accessories and other parts are supplied by individual lines.

Each cylinder is provided with an air starting valve, to which air is admitted by a corresponding pilot valve driven by the camshaft. Air requirements are cut to a minimum by this method. The cage-type relief valve is so designed that it can also be used as a compression release through manually-operated cam action that opens the valve. Provision is also made on each relief valve for attachment of a pressure indicator.

Speed is regulated by a mechanical or hydraulic governor. On marine models, the entire speed range is governor-controlled. The governor drive is through gears from the flywheel end of the engine. Starting and operating controls are centralized at the



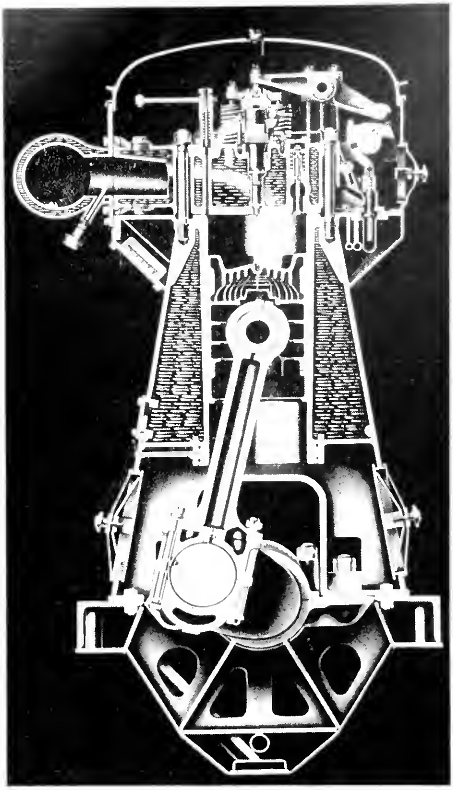
Cross section, side elevotion.

gage board, where reversing mechanisms for marine engines are also located. The gage board has tachometer, fuel, lubricating-oil and air-pressure gages and pyrometer.

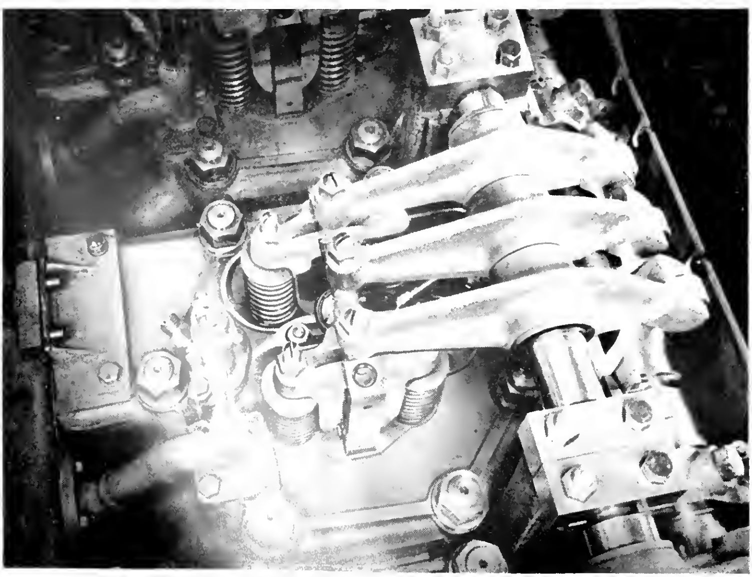
For power take-off, a friction clutch is provided as optional equipment at opposite end of engine from flywheel. Power up to 20 per cent of the rated horsepower may be taken from this clutch.

In marine installations, both direct and reduction-gear drive models have Timken marine thrust bearings, force-feed lubricated from engine, and built either as integral parts of the engine or reduction gear. Hendy planetary-type reduction gears or Farrel-Birmingham continuous-tooth single reduction gears are available as optional equipment. A flexible coupling is provided between the flywheel and reduction gear in either model.

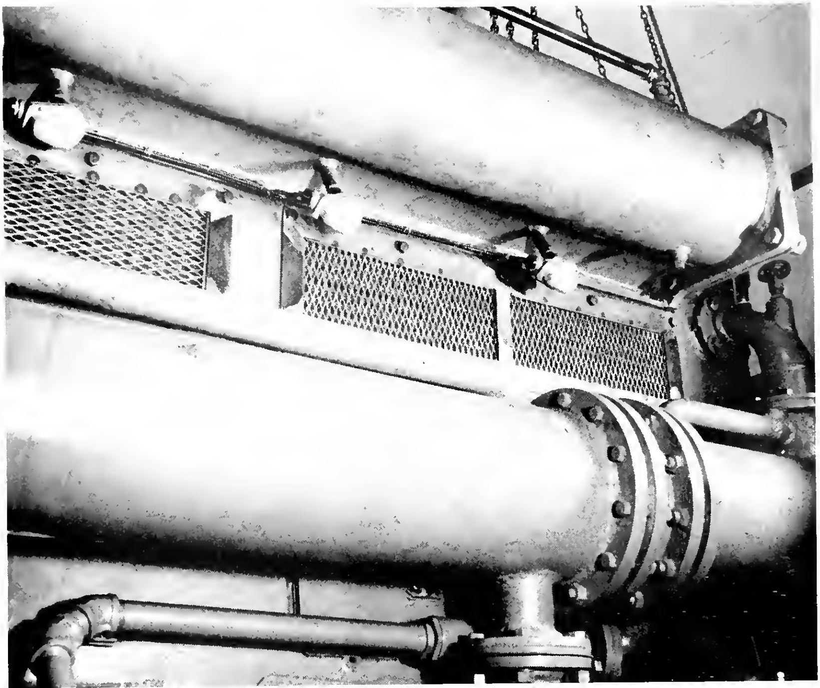
A positive oil supply is provided by the main lubricating system. Main bearing, crankpin bearings and piston pins receive a continuous supply of oil. This is augmented by a secondary system which provides oil for the rocker-arm pivot, rocker-arm bearings, ball joints and cam followers.



Cross section, end view, cutaway of the new engine.

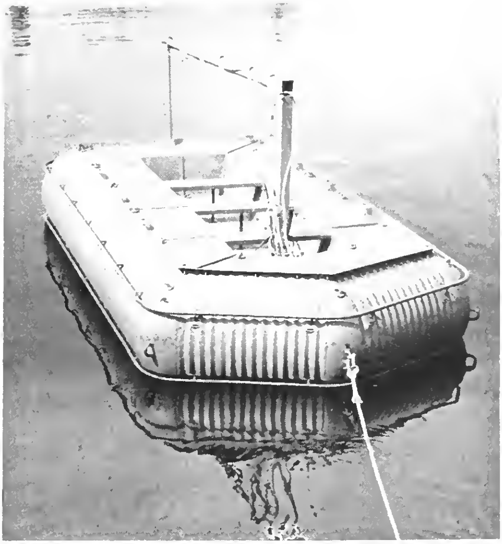


View of dual valve mechanism of the engine.



Water-cooled exhaust manifold, exhaust pyrometer connections, cooling water heat exchanger and air inlets.

Starting and operating controls.



Steel Life from the

LIFE RAFTS designed by the technical staff of the Marine Inspection Division of the U. S. Coast Guard are carried on steep slides aboard ship so that by tripping a latch they can be launched over the side into the sea. These rafts, in the latest designs, are fabricated of steel, weigh 3400 pounds and carry 20 persons in comparative comfort, together with considerable equipment, water and emergency rations.

Naturally the Coast Guard insists on very severe tests for life-saving equipment, and in the case of these life rafts tries to simulate in the tests the worst possible conditions likely to be met at sea. Specifications call for:

Dropping the raft endwise from a height of 45 feet into deep water;

Dropping the raft edgewise from a height of 45 feet into deep water; and,

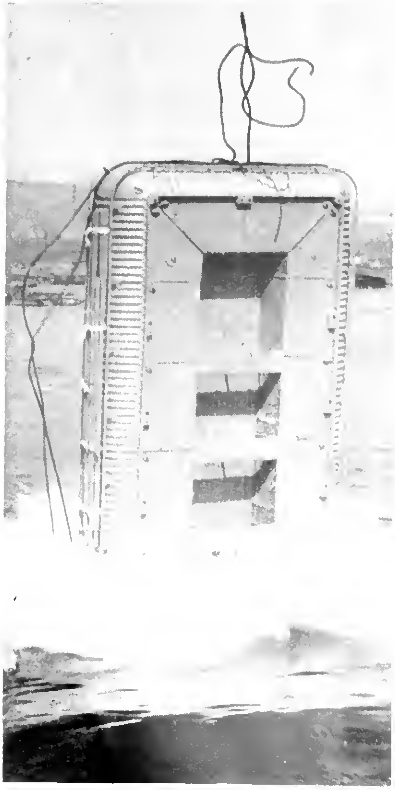
Dropping the raft in the flat position from a height of 45 feet into deep water.

The Coast Guard also requires several preliminary tests to demonstrate the buoyancy, freeboard, rowing aptitude, sailing efficiency, and passenger load requirements.

The Weber Showcase & Fixture Co., Inc., of Los Angeles undertook to manufacture 1500 of these rafts, the order being contingent on their production of a sample raft that would successfully pass all of these tests.

The pictures illustrating this article show the first raft being tested, and demonstrate better than textual description the neat workmanship and sturdy construction for which the firm is noted.

While the technical staff and the executives of the company had the utmost confidence in their design and calculations, and in the workmanship of their shop personnel, these tests were rather strenuous, and every one concerned was greatly relieved when the raft passed every test with flying



Above: The metal life raft riding at anchor. Mast for auxiliary sail is hinged and strapped down, showing how it will be carried when the sail is not in use. This mast is stowed inside before the raft is actually dropped into the sea.

Left: The raft falling into the sea after a drop of 45 feet. It was dropped three times to prove its ruggedness of construction.

Rafts Coast

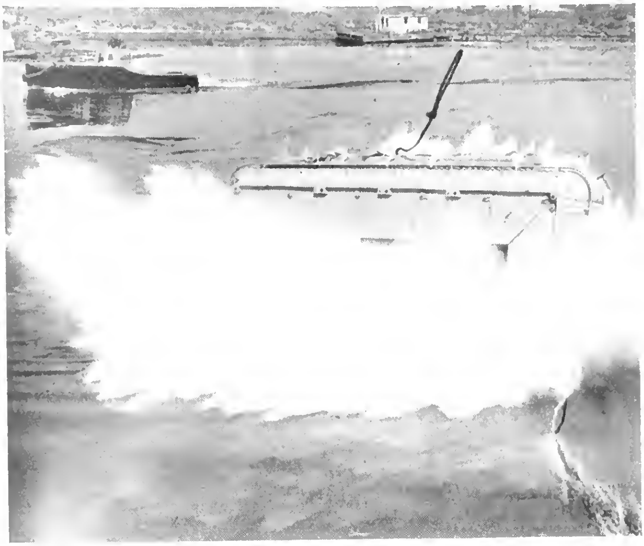
colors and was accepted officially by U. S. Coast Guard officials.

It is typical of Weber faith in their products that only one raft was built for this test. Although Coast Guard specifications do not call for a single raft to take all three of the drop tests, the Weber organization felt that every piece of life-saving equipment bearing their name should be able to stand up to its job under the most adverse conditions. So one raft took all the drops, and after each drop was examined with great care for any weakness in the structure.

No weakness was found, and at the conclusion of the tests the engineers were given the go-ahead signal to work out the best tooling and production techniques for the efficient manufacture of 1500 duplicate rafts

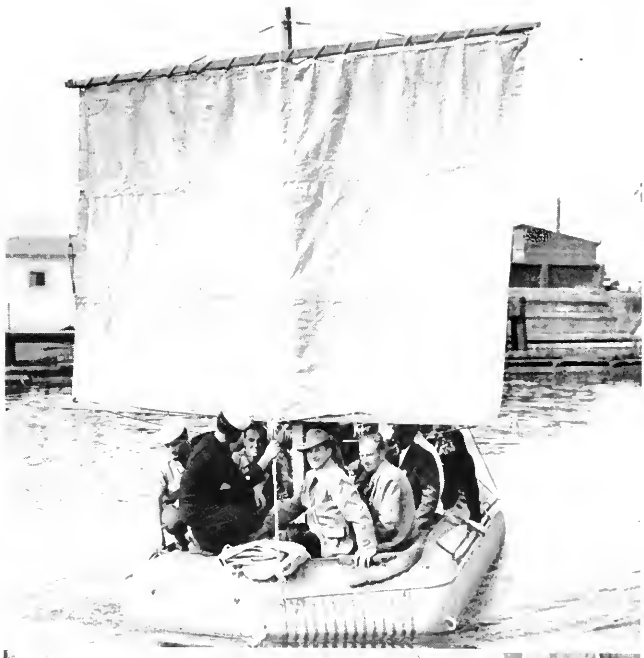
U. S. Coast Guard specifications were, of course, very definite as to exact requirements, but methods of construction were left up to the company's engineering and metal fabricating departments. Utilization of the powerful facilities of "Old Ironsides," mammoth hydraulic deep drawing press, which had already been doing a multiple job of unusual types of war production, was one of the first factors considered by the men assigned to do the job. Within a short time, dies designed to be used to press out the formations used in the construction of the pontoons were manufactured, and factory research was used to test the rigidity of these parts so constructed. Complete samples of these stampings were submitted to the proper authorities, and after official sanction had been received, "Old Ironsides" was given another unusual job to help carry on with the production for a victory program.

One of the most important factors to be considered at the beginning of this program was factory facility to carry on speedy production after preliminary tooling and engineering had



Above: Climaxing the second phase of the drop-off tests, the raft again falls into the water from a 45-foot height. No damage was suffered in the drops.

Right: An overall view of the setting where the drop-off tests were conducted. The photo was taken just before the raft was dropped for the third time, when its entire bottom hit the water at once.



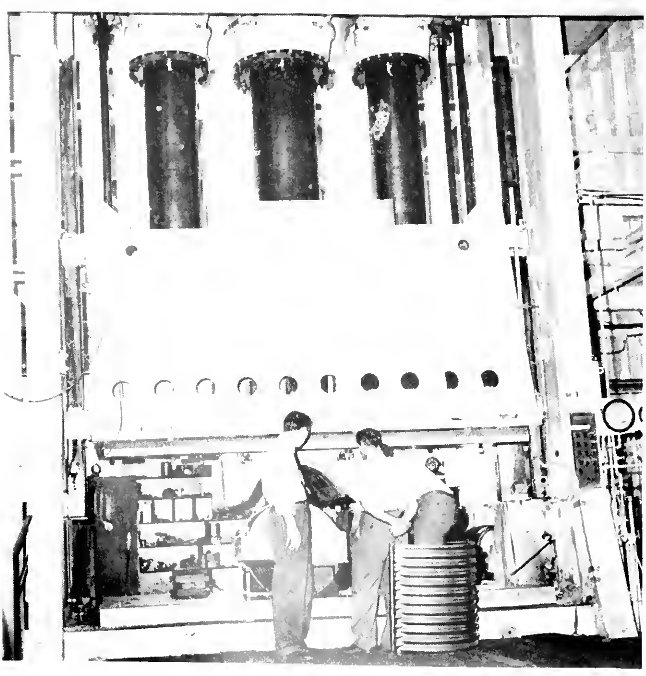
cleared the way for definite delivery schedules set up by the U. S. Coast Guard. In line with the policy of the company of expanding its plants to meet current war production needs, ground was broken for another addition to the already greatly enlarged factory, and the finishing work is being done on the life raft building.

It might be interesting to point out a few of the facts regarding the materials which will be used in the construction of these rafts. When fully loaded with specified gear, these rafts weigh approximately 3400 pounds.

A total of 4,607,208 pounds of steel will be used in the construction of raft bodies. This tonnage is broken down as follows: steel sheets and strips, 4,118,232 pounds; steel bars, 8784 pounds; steel pipe, 472,872 pounds; steel tubing, 7320 pounds. The contract will also require 60,024 pounds of brass castings and 8784 pounds of brass rods, making a total brass requirement of 68,808 pounds.

Actual welding of the seams will

A capacity load of 20 people sail on the raft during its preliminary tests.



require 39,025 pounds of 3/32″ welding rod. 9750 gallons of baking enamel will be required to paint the rafts.

In addition to this raw material there will be a sizable quantity of gear which will be stowed aboard these rafts. Some of the many items included are: storm oil, distress signals, signal pistols, blankets, drinking water, first aid kit, fishing tackle, life jackets, massage oil, Bible, compass, spray curtain, canopy, and sail.

Recently it was the privilege of Weber to have Basil D. Izzy, Seaman 1/c U.S.N., who spent 83 days on a raft, as a guest speaker at the plant. During his visit he was shown the raft which they were manufacturing, and was asked what they might do to aid in the comfort of those who might find themselves aboard one of their rafts. Seaman Izzy pointed out the value of such items as games and reading material, and as a result of his suggestion the company will provide games and copies of current magazines in addition to other specified material.

Production close-up of "Old Ironsides," a modern industrial giant, as first stampings for life raft production are taken out of it.

Pacific Coast Marine Activities

By Special Correspondents

Shipbuilder Sets Goal

Thirty ships in 1944 is the goal of Associated Shipbuilders, George H. Stebbins, general manager, announced. Sixteen vessels of four types were completed by this yard in 1943.

With the christening of two American mine sweepers, the Spector and the Staunch, on February 16, Associated completed the first step in its 1944 program.

These ships were built in the plant's graving dock, and a different procedure was followed in the christening ceremony. They were floated the day before and towed to outfitting docks, where the sharp crack of champagne bottles gave them their names.

Associated Shipbuilders were in charge of an interesting program at a dinner given by the Propeller Club of the United States, Port of Seattle, February 23. "Shipbuilding, Past, Present and Future," was the theme at the dinner.

Seamen's Snug Harbor

Seafaring men have a real "snug harbor" in the Penbrook Hotel, 317 Marion Street, Seattle, which is operated by the United Seamen's Service. A spacious lounge, with many floor lamps, comfortable chairs, a writing room, other accommodations and a library, has been opened. There is an information desk operated by volunteers from noon until midnight for the convenience of the seafarers.

Representatives of various social agencies in Seattle, the Y.M.C.A., the Y.W.C.A., and shipowners and operators, attended the opening of the new lounge.

Extensive alterations at the United Seamen's Service Club are planned. A bowling alley, new library and game room are included in the improvements. O. B. Maxwell is Seattle port area director of the United Seamen's Service.

Radio Current Buoys

Experiments with automatic radio buoys on Puget Sound, which were conducted for several months, have proved to be a success, officers of the United States Coast & Geodetic Survey announced.

Twenty-three of the buoys have been in operation and are working with startling accuracy. They measure the direction and velocity of currents and flash their observations in code signals to a central station in Seattle. Lieut. Comdr. Elliott B. Roberts of Seattle, a graduate of the Massachusetts Institute of Technology, who invented the buoys, said they have been improved and now represent a marked advance in methods for the determination of ocean currents.

A radio current meter makes possible automatic observations from a special survey-buoy placed on station in a manner somewhat similar to the Coast and Geodetic Survey's radio-acoustic range-finding stations.

By means of this apparatus, the velocity and direction of currents are automatically broadcast by the radio set within the buoy and are recorded on the chronograph tape at the station in Seattle. The radio buoys broadcast on slightly different frequencies, each buoy in turn.

The determination of current directions involved electrical contact of a magnetic compass element. It is believed to be the first time in science that this has been accomplished.

The inception of radio buoys dates back to 1941, when Commander Roberts began experimenting with the methods which finally were adopted. Extensive observations were made in 1942, and the perfected invention has been named the Roberts radio buoy.

Above: Direction and velocity of currents of Puget Sound are being measured by 23 radio buoys which automatically report their findings to a central station in Seattle. Officers of a survey ship are shown preparing to lower one of the buoys over the side of the vessel.

Right: Lieut. Comdr. Elliott B. Roberts, Seattle Coast and Geodetic Survey officer, who invented the radio buoy.

AWARDED MEDAL

Capt. Robert E. Blakefield, Seattle master mariner, is wearing the Merchant Marine Distinguished Service Medal, presented to him for heroism and skill displayed in an Alaskan port when a United States Army transport laden with many tons of bombs and ammunition burst into flames. The presentation was made on January 29 by A. R. Lintner, director of the North Pacific Area of the War Shipping Administration.

Left to right: Mr. Lintner; Brig. Gen. Eley P. Denson, U. S. A.; and Captain Blakefield.

W. S. A. Shift

O. B. Maxwell, formerly an intelligence officer of the Civil Air Patrol on the Atlantic Coast, has taken over the duties of Seattle Port Area director of the United Seamen's Service, succeeding H. C. Loft, who has joined the Recruitment and Manning Organization of the War Shipping Administration. Mr. Maxwell came to Seattle from the regional staff office of the United Seamen's Service in San Francisco.

Low Labor Turnover

With the lowest labor turnover of any shipyard on the Pacific Coast that has 5000 or more employees, the Lake Washington Shipyards plant is in first place, according to a report released by the Bureau of Labor Statistics of the United States Department of Labor. Lake Washington Shipyards topped the list for the lowest percentage of separations with 4.5 for each 100 employees. This group includes all quits, discharges, temporary layoffs, and workers who have gone into the armed forces. New hires at Lake Washington during the period, at 3.7 per cent, were the lowest of Pacific Coast shipyards.

1944 Salmon Fisheries

R. A. Ferrandini, field administrator and Alaska area coordinator of the Office of the Coordinator of Fisheries, has returned to Seattle from Washington, D. C., with the announcement that twelve additional salmon canneries will be operated in Alaska this year. A 10 per cent increase in the overall labor supply of the industry also will be made. This action was recommended by a group of salmon industry consultants appointed by the coordinator of fisheries.

Mr. Ferrandini will go to Juneau, Alaska, to meet with representatives of the United States Employment Service and the War Manpower Commission, to discuss quotas for the canneries.

Shipyard Shipped

Transported by steamship from Cordova, Alaska, Seattle's newest shipyard, the Treutle Marine Ways, is in full operation, with contracts for five vessels for the fishing industry.

A drydock, marine ways, machine shop, boat shop and wood-working equipment were shipped from Cordova to a site on the West Waterway, Seattle, a distance of more than 1500 miles.

The plant is owned by J. R. Treutle, who has been in the small-boat building business for 27 years. Mrs. Treutle, the shipyard owner's wife, is office manager.

The vessels building at the Treutle plant include an 80-foot purse-seiner for the Alaska Pacific Salmon Corporation and 52-foot purse-seiners for Anthony Anich, Joseph M. Suryan, John B. Suryan and Clark Parker.

A Safe Shipyard

C. M. Sigle, vice president and general manager of the Winslow Marine Railway & Shipbuilding Company, announced that the company has won third place in the National Victory Shipbuilding Safety Contest, sponsored by the Navy, the National Safety Council and the Maritime Commission. The Winslow plant is listed among the privately-operated yards engaged in both shipbuilding and ship repairs. A total of 116 yards in the United States entered the contest.

Northwest Briefs

Plans are announced for a $4,000,000 pier on the old Hastings Mill site in Vancouver, B. C. The new terminal will replace the Canadian Pacific Railway Company Pier D. destroyed by fire in 1938, and by its size will increase shipping facilities in Vancouver. It is one of several projects the Canadian Government is planning.

• • •

Christened the Cumberland Sound, another ship for the fleet of aircraft escort carriers, the "baby flat-tops," which have been aiding the U. S. Navy in a big way to clear the seas of enemy submarines, was launched from the Tacoma plant of the Seattle-Tacoma Shipbuilding Corporation on February 7. Mrs. Charles A. Pownall, wife of Rear Admiral Pownall, U. S. N., was the sponsor.

• • •

George Kachlein, assistant manager of the Tacoma Division of the Seattle-Tacoma Shipbuilding Corporation, told a Tacoma civic group that rumors of contract cancellations, which would result in drastic cutting of the number of workers, were untrue. He said that the current contracts would keep the yards busy at the present capacity until 1946. Mr. Kachlein said that no change in the management is contemplated. Such reports are damaginig to morale, he said.

• • •

Dispatching of longshoremen to their jobs on the Seattle waterfront by radio went into effect on February 14. The orders, telling the men when and where to report for work, are broadcast every day but Sunday at 3:45 o'clock in the afternoon. Radio dispatching of longshoremen has been in effect in San Francisco for several months.

• • •

Contracts for two invasion ships, part of a great fleet being built to carry troops and equipment for the United Nations to enemy shores, has been awarded to Yarrows, Ltd., shipbuilding plant at Victoria, B. C. Preliminary work on the craft has started. Several more contracts are expected.

• • •

During a recent visit in Seattle, James Sinclair, president of the Luckenbach Steamship Company, made an inspection of shipping facilities, drydocks and shipyards of the Seattle-Tacoma district. He conferred with

H. E. Rhoda, district manager of the Luckenbach Lines, with headquarters in Seattle, and was shown through Todd Seattle Dry Docks and the plants of the Seattle-Tacoma Shipbuilding Corporation in Seattle and Tacoma by R. J. Lamont, Sea-Tac president.

Marinship to Repair

Late in January, Rear Admiral Howard L. Vickery, in an informal talk to the employees of Marinship Corporation at Sausalito, California, sprang a surprise statement on his audience when he told them to "get ready for your third promotion."

Started as a Liberty shipyard, Marinship was promoted to tanker construction and made an excellent record in production of oil carriers.

"I have looked at your work," Admiral Vickery told the 7000 workers during their lunch period, "and I think you are doing a great job. Now you are ready for your next promotion, and that will be that you will probably have to tackle repair work."

No Slow-Down in 1944

There has been much loose talk of slow-down in shipbuilding, but Rear Admiral Vickery, in his recent tour of Pacific Coast shipyards, emphatically declares:

"There will be no slow-down in 1944, and probably none in 1945. The 18,500,000 tons planned for 1944 will take more man-hours to produce than the 19,000,000 tons delivered in 1943. The vessels are more complicated. Then, too, there will be a great deal of conversion work and much more repair work.

Confirming this remark of Admiral Vickery's, Admiral Land declares that he expects to take delivery of over 20,000,000 tons in 1944 and of a similar amount in 1945.

Seattle Pier

The new $3,000,000 big double pier at the foot of Connecticut Street, Seattle, is progressing nicely and is scheduled for completion in April, 1944. When finished, it will probably be turned over to the Army for the duration.

Big Navy Spending

The Navy Department is planning to spend $130,000,000 for various projects on the Pacific Coast. These plans include:

Four floating drydocks	$16,000,000
Supporting facilities for docks	8,000,000
Converting building basins to drydocks	4,000,000
Submarine overhaul facilities	10,000,000
Drydocks, Hunters Point	10,000,000
Completion of floating docks already started	23,000,000
Supporting facilities	33,000,000
Reserve for contingencies	26,000,000

Post-War Committee

R. L. Kingsbury, recently elected president of the Portland Steamship Operators Association, has appointed a strong committee to study post-war plans and possibilities. This committee includes: E. Stanley McGrath, Portland district manager of Sudden & Christenson, chairman; W. L. Williams, district manager, American Mail Line; and E. S. Coates, president of the Waterfront Employers of Portland.

Safest Shipyard

The National Safety Council has granted the "Distinguished Service to Safety Award" to the California Shipbuilding Corporation for their achievements in safety during 1943. In making this award, Col. John Stillwell of Chicago, president of the Safety Council, said: "We grant this in recognition of the excellent safety record developed by you. While delivering ships in record time, you have made your yard more than twice as safe as any other shipyard in this country."

In 1943 Calship's 40,000 employees delivered 196 vessels with an aggregate deadweight tonnage of 2,074,728. While making this tremendous delivery they achieved a reduction in accident frequency rate that brought the award.

In the long history of the National Safety Council, this award has been granted to only 20 industrial concerns. California Shipbuilding Corporation is the only shipyard and the only Pacific Coast firm to achieve this prize.

Stay-on-Job Drive

Influences which make it possible for workers in war plants and essential civilian services to "stay on the job and finish the job" are being brought to the front in a countywide campaign by the Los Angeles Citizens Manpower Committee, which started during the week of February 15 and runs to March 5.

Points being stressed throughout the "presenteeism" drive are as follows:

(1) Greater utilization of child care centers and the opening of more centers.

(2) Development of additional housing facilities through construction, conversion and home sharing.

(3) The need for more man power to operate the city's street cars and buses so that workers may have adequate transportation.

(4) Night openings of stores and services upon which daytime war workers depend.

(5) Double-duty workers — persons who will work in essential industry four hours in addition to their regular tasks.

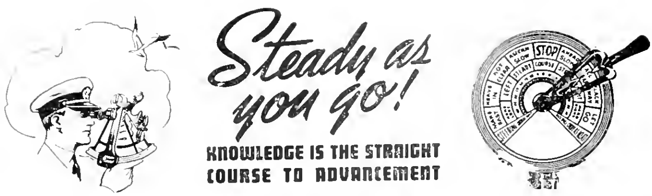
Iron Fireman "Water Buffaloes"

The Iron Fireman Manufacturing Company in Portland is one of the important subcontractors of the Food Machinery Corporation of California and Florida, which is making the amphibian tank known as the "Water Buffalo." Iron Fireman's Portland plant is making the main drive shaft and numerous other parts.

"Water Buffaloes" are playing an important part in the South and Central Pacific invasion points. They were indispensable in landings at Tarawa, New Britain, and the Marshalls.

These parts are made in the main plant in Portland. This plant also is a supplier of parts for Flying Fortresses and other aircraft, and continues to manufacture high priority stokers.

The recent $2,500,000 fire partially destroyed the company's third Portland plant, which was acquired two years ago exclusively to produce engines for Liberty ships. Plants Nos. 1 and 2, which are located several miles from Plant 3, continue to operate to full capacity.



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

NEW SPECIMEN EXAMINATIONS FOR LICENSED OFFICERS

This month we continue the series of specimen examinations for deck officers of ocean-going merchant ships. These questions and problems were prepared by the U. S. Coast Guard Marine Inspection Division strictly as specimen questions to give a good indication of the type and variety of subjects that should be studied by the candidates for examination for raise in grade to the designated rank. This installment covers the information required of those who are seeking to become chief mate on ocean steam and motor vessels.

CHIEF MATE—OCEAN STEAM AND MOTOR VESSELS

Subject: NAVIGATION[1]

1. Latitude by Polaris and Compass Deviation.

January 27, 1942, a vessel in D. R. latitude 27°34′ N., and longitude 74°17′ W., observed Polaris for latitude and compass deviation at about 17^h50^m ship's time. Chronometer time of observation was $22^h49^m50^s$, chronometer slow 14^m17^s. Sextant altitude was 28°43′, index error nil and height of eye 50 feet. Polaris bore 359½° p.s.c., variation 2.5° W., ship on course 182° p.s.c.

Required: Latitude at time of observation, deviation of standard compass and vessel's true course.

Time allowed—1 hour.

2. Ex-Meridian—Sun.

November 21, 1942, a vessel in D. R. latitude 14°28′ N., and longitude 163°29′ W., obtained an observation of the sun's lower limb shortly before L.A.N. Chronometer time of observation was $22^h25^m26^s$, chronometer fast 23 seconds. Sextant altitude was 55°10′, index error 0′30″ on the arc, and height of eye 35 feet.

Required: The latitude at time of sight.

Time allowed—1 hour.

3. Ship's Position by Lines of Position.

August 13, 1942, on a vessel in D. R. latitude 41°30′ N., and longitude 71°50′ W., only one A. M. sight was obtained, of the planet Venus at 4:35 a. m., ship's time. Chronometer time of observation was $9^h26^m10^s$, chronometer was slow 8^m30^s. Sextant altitude was 18°03.6′, index error 0.2′ off the arc, and height of eye 43 feet. Venus bore 85° p. s. c., variation 14° W.

From 4:35 a.m., ship's time, course 73° per standard compass was steered, speed 14.5 knots.

At 9:29 a.m., ship's time, a sight was obtained of the sun's upper limb. Chronometer time of observation was $14^h20^m08^s$. Sextant altitude was 49° 56.7′, index error unchanged.

Required: The ship's position at 09-29 and position plotting sheet showing ship's true course and position lines plotted and properly labeled.

Time allowed—3 hours

4. Mercator Sailing.

What is the true course and distance, by Mercator sailing, from Ambrose Channel Lightship, 40°27.1′ N., and 73°49.4′ W., to a position 10 miles east of San Salvador (Watlings) Lighthouse, Bahama Islands? What compass course would you steer if your deviation is 4° W. and the variation 2° W., at Ambrose Lightship and 12° W. at San Salvador Lighthouse.

Note. — Dead reckoning may include middle latitude, traverse or Mercator sailing.

Time allowed—1 hour.

5. Azimuth—Star.

July 3, 1942, on a vessel in D. R. latitude 42°00′ N. and longitude 65° 21.9′ W., an azimuth was taken of the star Capella for compass deviation, at about 4 a.m., ship's time. Chronometer time was $8^h01^m48^s$, fast 28^m48^s. Capella bore 58°, p. s. c., variation 19° W. Ship on course 253° p. s. c.

Required: Deviation of the compass for ship's head and vessel's true course.

Time allowed—1 hour.

6. Bearings.

1. A vessel on course 30° was abeam a light at 0900. At 1112 a buoy bore 352° and at 1128 it was abeam. The distance from the light to the buoy was 26 miles.

Required: The ship's speed and the distance off the buoy when abeam.

2. A vessel steers 188° and a current sets S. 5° W. at the rate of 3 knots. At 0915 a light bore 127° and at 1010 the same light bore 98°. Vessel's speed through the water is 12.8 knots.

Required: The distance from the light at 1010.

3. Making 13 knots, you figure you are due abeam a light at 1150 and have orders to be 4 miles off. At 1100 you pick up the light bearing 10° on the bow. Would you hold your course or alter it, and if so, how much?

4. What vertical danger angle would you set your sextant to if you wished to pass 2.3 miles off a lighthouse listed as being 145 feet above water?

Time allowed—1½ hours.

[1] Candidates may use any navigational methods they wish in the solution of problems, provided they are correct in principle.

Speed by Revolutions.

1. What is the actual speed of a [s]teamer turning up 79 r. p. m. if the [pi]tch of her wheel is 17.6 feet and [sl]ip 7 per cent?

2. If the run by engine revolu[ti]ons was 290 miles and the run by [ob]servation 267, what is the per[ce]ntage of slip of the wheel?

3. If the engine speed necessary [t]o reach port at a designated time is [1]3.7 knots and the pitch of wheel is [1]4.3 feet, how many revolutions per [m]inute would have to be turned up?

Time allowed—1½ hours.

Subject: INSTRUMENTS AND ACCESSORIES

1. What is the deviation of the [ra]dio direction finder caused by? Do [m]agnets cause deviation of the radio [d]irection finder?

2. How do you start a stopped [c]hronometer?

3. How do you read a mercurial [b]arometer?

4. How would you measure a hori[z]ontal angle with a sextant?

5. Explain briefly the use of a [r]ange finder.

6. When using the fathometer, [s]uppose three distinct flashes are [r]egistered on the dial, which one [w]ould you be guided by?

7. In lubricating the log, do you [t]hink it best to pack it with grease [o]r merely with a light oil?

8. How are chains and wire con[n]ections between pilot house and en[g]ine room telegraph adjusted?

9. What liquid is employed in a [t]elemotor system?

10. What is a hydrometer and [w]hat is it used for?

Time allowed—2 hours.

Subject: MAGNETISM AND COMPASS

1. How would you stow a com[p]ass when out of use?

2. Steering NNE., with a port list, [i]n the Northern Hemisphere, on [w]hich side of the course would your [s]teamer fetch if no allowance is made [f]or heeling error?

3. Describe how you would place [t]he Flinders bar. In what locality is [i]t best to make this adjustment?

4. Describe how you would head [a] ship east, true, using the sun.

5. A ship's course by gyro is 200° [a]nd by magnetic compass is 187°. [T]he error of the gyro is 1° E. and [t]he variation is 8° 30′ E. What is the [d]eviation of the magnetic compass?

Time allowed—1½ hours.

Subject: CHART NAVIGATION

1. Explain completely, in detail, how you would construct a plotting sheet for use over a small area. Illustrate with a sketch.

2. Describe the wind rose and its purpose as used on the hydrographic pilot charts.

3. When projected upon a Mercator chart, is a great circle course a curve or a straight line? Why?

4. Name the three methods of finding the great circle course.

5. What are the limitations of middle latitude sailing?

6. What are the "Sailing Directions" and what information do they give?

7. What methods would you use to ascertain the position of your vessel when in sight of land?

8. How can you check a fix which has been determined by only two bearings?

9. In piloting a vessel through a curved section of a tidal river, where would you find the deepest water and the most rapid current?

10. Explain and illustrate the use of the danger bearing.

Time allowed—2 hours.

Subject: AIDS TO NAVIGATION

1. What is indicated by the red band of a horizontally banded buoy being uppermost? What color light would it show?

2. Why should positions be determined by fixed objects ashore rather than buoys, whenever practicable?

3. If a fixed white light suddenly became visible ahead of you, how would you determine whether it was a vessel's light or a government lighthouse?

4. How are bearings referring to sectors in lights expressed?

5. What International Code flag signal is displayed by a lightship under way or off station?

6. How would you take a Sense Bearing on the radio direction finder?

7. Describe the principle upon which the fathometer operates and how this principle is utilized to obtain soundings.

8. Off a high rocky coast in a fog, you blow your whistle and it takes 33 seconds for the echo to return to the ship. How far offshore are you? What would you bear in mind as to the possible relative position of the land returning your echo and the position of the beach?

9. You sight a mountain peak just breaking clear over the horizon. If the chart lists the height of the mountain as 2,450 feet and your height of eye is 55 feet, what is your distance off?

10. In thick weather off Fire Island Lightship, which is equipped for distance finding, you start your stop watch at the end of the long dash on the radio direction finder and then note that 14¾ seconds elapse before you hear the same signal on the fog diaphone. What distance are you off the Lightship?

Time allowed—1½ hours.

Subject: TIDES

1. You expect to leave port at about time of low tide. Explain how you would determine what depth of water will be available in the channel at that time.

2. What is meant by the vulgar establishment?

3. To what plane of reference do tidal data on the following refer: (a) The Atlantic Coast of the United States; (b) the Pacific Coast; (c) British charts?

4. How can you find the time of high water when the tide tables are not available?

5. In a locality where the rise and fall of the tide is considerable, such as in the Bay of Fundy, or in making the Eastern Entrance to Magellan Strait where the difference is as much as 7 fathoms, what precautions do you take in comparing your soundings with the level of those given on the chart?

Time allowed—1 hour.

Subject: OCEAN WINDS AND WEATHER

1. Why is a knowledge of the weather necessary for the safe navigation of a vessel?

2. Where can detailed information about ocean winds and currents be obtained?

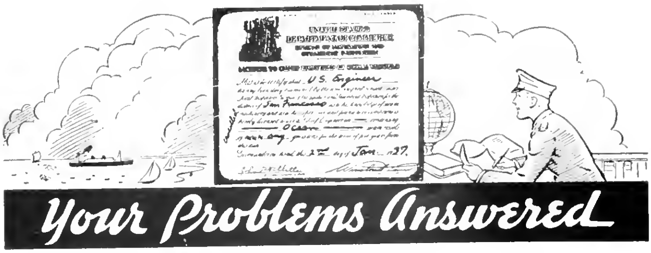
3. Describe the track usually taken by revolving storms in the West Indies and North Atlantic. State the speed at which they progress and the times of the year that they occur most frequently in that region.

4. Which is the dangerous and which the navigable semicircle in tropical revolving storms? State the reason.

5. You are on the line of progression of a cyclonic depression in the Northern Hemisphere. Describe the conditions of wind and weather you would experience and what action you would take.

Time allowed—1 hour.

(Continued in April issue)



by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California

ELECTRIC DRIVE TANKERS

XIV—REDUCTION GEAR FOR AUXILIARY SETS

The reducing gear, Fig. 1, is the single-reduction, single-helical type, and reduces the turbine speed of 5645 rpm to the generator speed of 1200 rpm.

The gear is built to the following specifications:

Ratio	4.7045
Diametral pitch	8.0967
Number of teeth in pinion	44
Number of teeth in gear	207
Pitch diameter pinion	5.4342
Pitch diameter gear	25.5658
Width of face	8¼ in.
Helix angle	20 deg., 18 ft., 1.83 in.
Pitch-line velocity	8020 ft. per min.
Tooth pressure at 525 kw.	386 lb. per in. of face
Pinion bearing size	4 in. x 4 in.
Gear bearing size	4 in. x 4 in.

The pinion (12), Fig. 1, is forge integral with the shaft. One end c the shaft is provided with a flang that bolts rigidly to the turbine sha and through which one end of th turbine rotor is supported. The othe end of the pinion shaft has an exte sion on which is assembled the thru bearing.

The gear wheel (11), Fig. 1, is steel forging and is pressed and keye on a forged steel shaft (8). One en of the gear shaft is solidly coupled t the generator shaft, and part of th weight of the generator rotor is ca ried by the gear bearing at that enc The turbine end of the shaft is ex tended to carry the spiral gear tha drives the oil pump and the governo

The bearings are cylindrical an of the steel back, babbitt-lined typ They are split on the horizontal cer terline, and the two halves are hel in alignment by dowel pins in th joint faces. The bearings are locate in their seats and kept from rotatin by locating washers which are hel on the casing joint by screws an project into pockets in the outer su face of the bearing linings.

Lubricating oil is supplied by th pump (Fig. 2) to a radial groov cored in the bearing seat and cap, an enters the bearing through a fee slot in the joint surface of the bear ing. Even distribution of oil over th bearing surface is insured by a distr

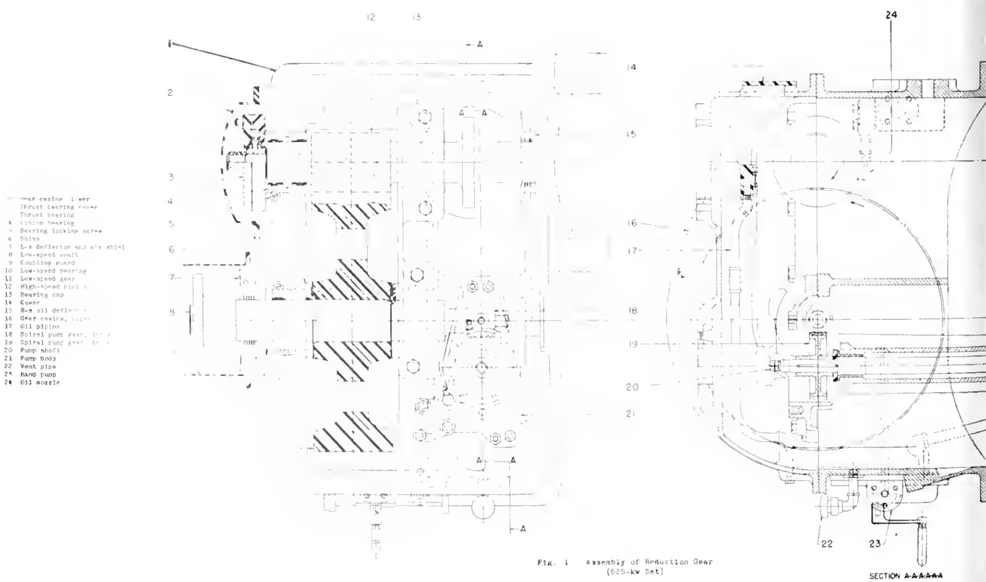


Fig. 1 Assembly of Reduction Gear (525-kw Set)

ıtion recess on the inner surface of e bearing.

The pinion thrust bearing, Fig. 3, mounted on the generator end of e pinion shaft (3), Fig. 1, and holds e rotor in the proper axial position. his bearing consists of a thrust col- r (9), Fig. 3, which is locked to the nion shaft, and two babbitted rust plates (2) and (8) which are ılted to the casing and between hich the collar rotates. The axial ısition of the collar is determined ' the thickness of the spacer be- veen the collar and the shoulder on e pinion shaft against which the llar is held. The running clearance etween the collar and the thrust ates is determined by the shims (6) ıd (7) between the plates, and ıould be from .008 to .010 inches. ı adding or replacing shims, care ust be taken that the oil holes line ɔ.

Oil is supplied through drilled pas- ges from the pinion bearing seat ıd enters the bearing at the inside ameter of the thrust faces on the ırust plate. It is carried across the ırust faces by the rotation of the ırust collar and into the discharge ıssages in the thrust plates.

The axial position of the gear-gen- rator rotor is maintained by the ırust faces on the gear bearings hich bear against the thrust sur- ıces machined on the ends of the ear hub. Running clearance of .008 ɔ .010 inches is allowed, and may be djusted by the shims (6), Fig. 1, etween the shoulder on the gear earings and the casing.

Fig. 3: Thrust bearing.
(1) Gear casiag (upper). (2) Thrust bearing. (3) Shim. (4) Gear casing (lower). (5) Shim. (6) Shim. (7) Shim. (8) Thurst bearing support. (9) Thrust collar. (10) Drake lacknut. (11) Cover.

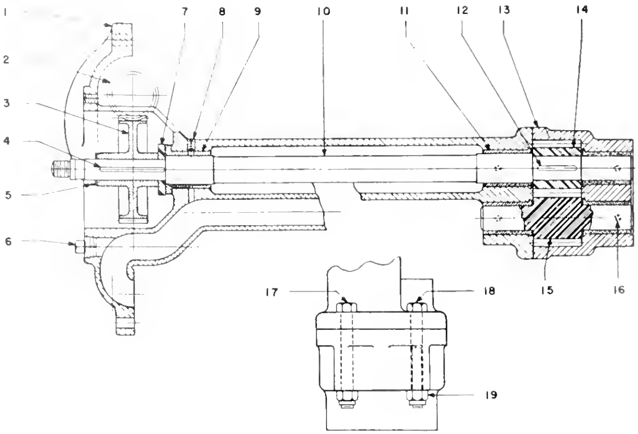
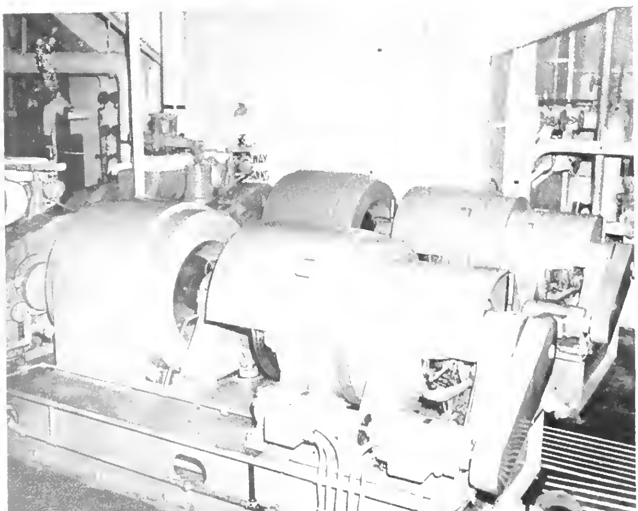


Fig. 2: Main oil pump.
(1) Pump casing. (2) Spiral gear, driver. (3) Spiral gear, driven. (4) Key. (5) Lock washer. (6) Pipe plug. (7) Plate. (8) Set screw. (9) Bushing. (10) Shaft. (11) Bushing. (12) Key. (13) Pump cover. (14) Pump gear, driver. (15) Pump gear, driven. (16) Set screw. (17) Balt. (18) Body-bound balt. (19) Unshako nut.

A hand-operated oil pump is mounted on the outside of the gear casing, as shown at (23), Fig. 1, and is used to force a supply of oil to all bearings before the set is started. This is a gear type pump and draws oil from the reservoir at the bottom of the gear casing.

Oil Pump

The oil pump, Fig. 2, is of the gear type with the pump gears submerged in the oil tank. It is driven by a spiral gear (3), Fig. 2, mounted on the top of the pump shaft; which, in turn is driven by a spiral gear (2) keyed to the turbine end of the gear shaft. These spiral gears, which also drive the turbine governor, have a ratio of 2.06 to 1, giving a pump speed of 584 rpm.



Auxiliary turbo generators at starboard side of generator room.
(Photo courtesy Marinship)

Turbine Electric Ship Drive

by J. A. Wasmund

The present war has been largely responsible for the current widespread application to tankers of turbine-electric a-c drive. Prior to this it had been difficult to convince the prospective operator that turbine-electric a-c drive had sufficient advantages to warrant its use over geared turbine drive, which could be obtained at less initial cost and lighter weight.

When the gear cutting capacity of the nation became insufficient to meet the demands for this type of propulsion equipment, turbine-electric drive was selected for a large number of Maritime Commission and Navy ships.

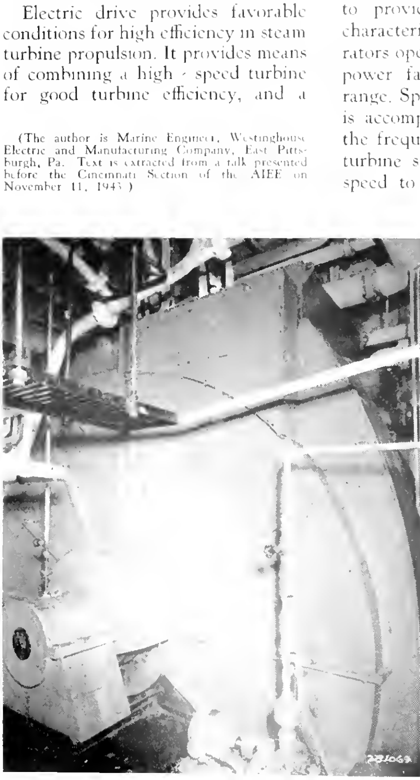
Electric drive provides favorable conditions for high efficiency in steam turbine propulsion. It provides means of combining a high - speed turbine for good turbine efficiency, and a relatively low-speed propeller for the best propeller efficiency. The Westinghouse electrical system employed has thoroughly proved itself in practice. It permits flexible arrangement as to the machinery location, is quiet in operation, and gives ease in maneuverability. The turbine runs continuously in one direction, and the same torques and speed variations are available for propulsion astern or for maneuvering as for ahead operation.

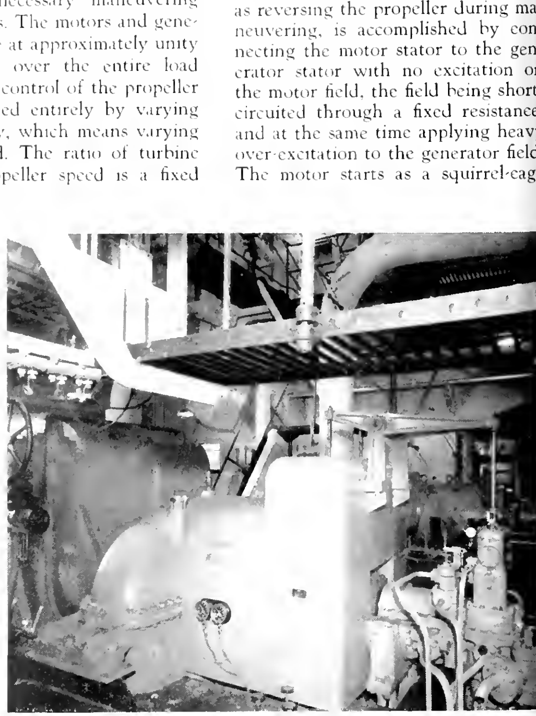
(The author is Marine Engineer, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. Text is extracted from a talk presented before the Cincinnati Section of the AIEE on November 11, 1943.)

Modern a-c turbine electric design makes use of synchronous generators and synchronous motors with heavy damper winding carefully designed to provide necessary maneuvering characteristics. The motors and generators operate at approximately unity power factor over the entire load range. Speed control of the propeller is accomplished entirely by varying the frequency, which means varying turbine speed. The ratio of turbine speed to propeller speed is a fixed value, and is a ratio of motor field poles to generator field poles. The generator normally has two poles and the motor has as many as required to bring about the necessary speed reduction. This results in a motor which is quite large in diameter in order that individual pole faces do not become too narrow.

One important consideration in a-c turbine electric drive is the proper design of the motor, generator and control in order that the necessary torque will be available at the propeller shaft, during starting and maneuvering as well as steady running conditions.

Starting the ship from rest, as well as reversing the propeller during maneuvering, is accomplished by connecting the motor stator to the generator stator with no excitation on the motor field, the field being short-circuited through a fixed resistance and at the same time applying heavy over-excitation to the generator field. The motor starts as a squirrel-cage





Above: Main propulsion turbine generator set.

Left: Installed view of forward end of propulsion motor.

induction motor operating on the damper windings, and is synchronized with the generator as soon as the slip has decreased to within from two to five cycles per second by applying field to the motor. Over-excitation is maintained on the generator by a time delay relay for approximately 1½ seconds after field is applied to the motor in order to insure sufficient synchronizing torque.

In order that the damper winding of the propulsion motor may be properly proportioned as to resistance and current-carrying capacity to povide the proper synchronizing torque, it is highly desirable that the propeller speed torque characteristics of the ship be available to the motor designer. In some cases model tests are made on the hulls, and such information is of great value. In most cases, however, it is necessary to make assumptions regarding propeller thrust and torque. During the past four years, we have been able to obtain trial test data on many types of hulls, and as a result these assumptions can be made with considerable confidence. With sufficient data on the proposed vessel, it is possible to make quite accurate mathematical calculations of the maneuvering performance. The approximate time required to stop the propeller on full speed reversal, the head reach of the vessel, the time required to synchronize the motor in the astern direction, and the performance of the equipment at all points during the reversing cycle, can be calculated.

The shape of the propeller speed torque curve varies with the type of hull, number of propellers, speed and horsepower. In general, however, on full speed reversal, the propeller torque decreases very rapidly to zero at somewhere between 50 and 70 per cent of ahead rpm, and increases rapidly to a peak astern torque somewhere between 15 and 35 per cent of ahead rpm. The torque then decreases to a minimum at zero rpm, and again rapidly increases as the propeller is brought up to speed in the astern direction. In order to synchronize in a minimum time, the speed torque curve of the propulsion motor, running as an induction motor, must meet two conditions: (1) it must be sufficiently high at high slip to pass the "hump" of the propeller speed torque curve, and (2) also have high torque at low slip in order to synchronize in minimum time on rapidly increasing torque on astern

Propulsion control board.

rpm. These two diametrically opposing requirements make it necessary to compromise between high resistance damper windings which will produce high torque at high slip and low resistance damper windings which will produce high torque at low slip. In order to aid the low slip synchronizing point, it sometimes becomes desirable to incorporate in the control a second starting position which will cut part of the fixed resistance out of the short circuited motor field circuit and thus increase the induction motor torque at low slip.

The turbine generator is a three-bearing unit, the generator rotor at the turbine end being supported by the turbine bearing and a pedestal bearing supporting the opposite end. The stator of the propulsion generator is fabricated from steel plates suitably shaped to receive the core laminations. Cooling air passages are provided through the core, at approximately two-inch intervals, by spacer plates. Air is circulated, by the rotor fans, through the air gap and through these passages, and in so doing absorbs the heat generated by losses in the generator. The hot air is exhausted at the top of the frame, where it is passed through a finned tube type cooler and returned to the cooling circuit. Thus the same air is used again and again, and a clean machine is assured. The cooling medium is sea water, and maximum rating is based on a water temperature of not more than 85°F.

The generator rotor is a solid steel forging with radial slots in which are the two-pole field windings. Steel retaining rings as well as non-magnetic slot wedges hold the windings in the slots. Integral blowers are mounted at each end. The collector is mounted outside the bearing, and leads are brought to it through a hole in the shaft.

The propulsion equipment is all controlled from the engine room control board (see illustration). All contacts are manually operated by means of the three levers mounted in the stand at the center of the board. The left-hand lever controls maneuvering; when moved forward, the ahead direction switch is closed, over excitation is applied to the generator field on Start 1 position, and the motor field is short circuited through a starting resistor. On Start 2 position, the motor field resistance is decreased; and on the Run position, the motor field is excited and the generator field reduced to normal.

The middle lever controls the governor setting the turbine. It is mechanically interlocked with the maneuvering lever so that it cannot be moved from the low speed position unless the maneuvering lever is in the Stop or Run position. The maneuvering lever cannot be moved unless the speed lever is in the low speed position. Turbine speed is increased by movement of the speed lever toward the operator.

The right-hand lever is for emergency use only, and serves to limit the steam flow to the turbine, if required, during heavy weather.

The set-up switch handwheel, lower right, permits connection to either exciter set. Note the latch, which must be released before the wheel can be turned; tripping the latch opens the excitation circuit so that the contactors are not required to open under load.

Keep Posted!

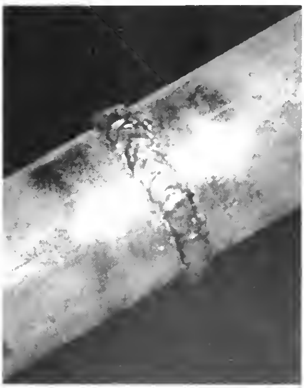
NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

New Application for Galvalloy

A comparatively new application for Galvalloy has been announced by the manufacturers, The Metalloy Products Company of Los Angeles.

Galvalloy will bond to practically any metal surface without the use of flux. It is also a good aluminum solder. The surface to be soldered, or coated, is heated with a welding torch to about 600° F. The bar of Galvalloy is then applied against the surface and a small amount allowed to flow. This is then spread evenly over the surface with a wire brush. The result is a very bright non-corrosive coating.

Weld in a galvanized pipe with spot plated with Galvalloy.



An important new use for this product has been developed in the shipyards on the West Coast. It has been found that Galvalloy saves considerable time in pipe shops where galvanized pipe is cut with a welding torch, thus burning the galvanizing off of the cut joints. Galvalloy can be applied very rapidly to these parts without any fuss or bother with sandblasting equipment or moving the pipe from its position.

Also after fabrication of the pipe fittings on board ship, it saves considerable time over other methods of applying protective coatings to welds, and fills a long-felt need in giving 100 per cent protection to all welds on pipe fittings and joints.

One maritime yard found Galvalloy to be of help in protecting welded joints on booms. This yard is also using the material as a coating on some of its rivet heads. Another yard found it to be of advantage in covering welded seams on the inside of fresh water tanks. Other methods which required sandblasting were very difficult to use in such close quarters. Galvalloy does not create fumes, and therefore there is no hazard in its use.

As a non-corrosive coating, it has been proved to be superior to galvanizing. Tests for 30 days in salt spray and river water, with bends at the welds, after the application showed no evidence of corrosion. However, in some places surrounding the Galvalloy the galvanizing broke down.

Sealed Transformer

A new hermetically-sealed transformer, designated "Type S," has been developed by engineers of the Peerless Electrical Products Co., Los Angeles manufacturers of transformers for aircraft, marine and ordnance installation.

Designed for use in all theaters of war operation and on all types of equipment, the new transformer, recently approved by the United States Navy, is of extremely rugged construction, having a case of cold drawn copper cadmium plated steel. It uses a terminal molded into a plastic block which has a metal flange molded into its periphery. This flange is then soldered into the case. This new construction offers great flexibility in number and arrangement of terminals.

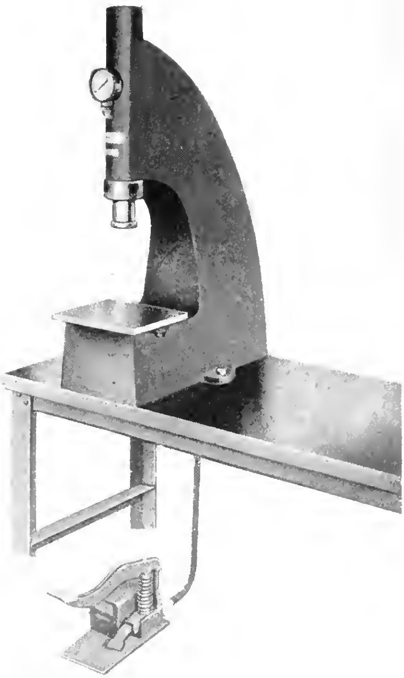
As in all Peerless transformers their exclusive "Vac-sealing" impregnation process is used, insuring absolute impregnation without solvents or other deleterious material present inside the coil.

Increased plant facilities permit production of the new Type S transformer in any desired size or capacity to customers' specification.

New "Type S" hermetically-sealed transformer.

Left: Safety plate grips.

Right: Hy-Speed hydraulic press.



Safety Plate Grips

Downs Crane and Hoist Co., Los Angeles, California, have manufactured safety plate grips over a period of fifteen years, and these grips meet the most exacting standard required in plate lifting. All sizes will exert a positive non-slip grip on any material within their jaw capacity. They will handle plates, pipe, shapes, or any materials that can be properly inserted in the jaw opening.

The jaws are smooth and will not damage finished surfaces. These grips are easily applied or released by one man. With long thin sheets or plates, two or more grips may be used on a spreader bar to prevent the material from bending of its own weight. Material may be lifted from or laid down in a horizontal position without the slightest danger of the grips releasing.

Hy-Speed Hydraulic Press

Rugged all-steel construction and simplified hydraulic foot control are outstanding features of the new press manufactured by Reimuller Brothers Company, Franklin Park, Illinois.

This press is designed for a more speedy and efficient handling of assembling, broaching, grooving, riveting, sizing, straightening, marking, forming, and scores of other small press operations. It is made in two models of 10- and 20-ton with 50 per cent overload capacity. Hydraulic vises in two sizes are also manufactured.

Only two levers are used in the hydraulic foot-control: one applying even pressures of any degree, as rapidly or as slowly as desired; the other for release. Operator's hands are always free for work. No outside airlines are needed. The unit is self-air-eliminating without any bleeding.

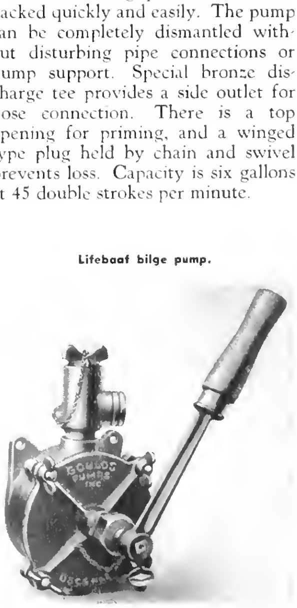
Lifeboat Bilge Pump

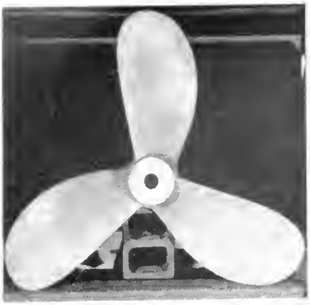
A new bilge pump, approved by Merchant Marine Inspection Division, U. S. Coast Guard, and manufactured by Goulds Pumps, Inc., Seneca Falls, N. Y., provides practically foolproof bilge pumping in lifeboats and other small craft up to and including those of 700 cubic feet capacity. Lever is chained to pump body to prevent loss and can be turned out of the way easily.

This unit can be dismantled for ordinary inspection and repair, and reassembled quickly without wrenches or other tools; it uses thumb screw and wing nut construction throughout; is adapted for compact bulkhead mounting — wing nuts clear pump body; employs all bronze construction and is impervious to salt water corrosion.

The oscillating piston can be repacked quickly and easily. The pump can be completely dismantled without disturbing pipe connections or pump support. Special bronze discharge tee provides a side outlet for hose connection. There is a top opening for priming, and a winged type plug held by chain and swivel prevents loss. Capacity is six gallons at 45 double strokes per minute.

Lifeboat bilge pump.





Meehanite Metal propeller casting at Cooper-Bessemer's Grove City, Pa., plant.

Meehanite Metal Propellers

Cooper-Bessemer Corporation one-piece, three-bladed Meehanite Metal propeller castings, being produced for U. S. Coast Guard vessels, have passed rigid inspection and testing, proving that this metal has the strength and structural characteristics necessary for this application. Meehanite Metal, with a far higher tensile strength range than ordinary cast iron, has been used with great success by Cooper-Bessemer for several years in the production of engine castings.

Conversion to Meehanite castings has reduced propeller production costs as much as 50 per cent, in addition to conserving a substantial tonnage of critical bronze which can be used in fabricating other vital war equipment.

As an exclusive licensee for Meehanite Metal in the manufacture of diesel engines, gas engines, compressors and other equipment for marine and industrial purposes, Cooper-Bessemer metallurgists, research engineers and foundrymen have contributed many developments in foundry processes that are widely used in the nation's war industries.

New Floodlight

The new Revere 500-watt floodlight, Navy Specification 9S-5452, offers a very efficient means of lighting wherever controlled light sources are needed.

Designed for rugged service, built to withstand concussion, vibration and exposure to sea atmosphere, this new light is manufactured by the Revere Electrical Manufacturing Co., Chicago, Illinois.

The housing is of [illegible] steel accurately formed [illegible] lined in shop. Hinged on widely spaced supports and fitted with sure-tight winged screw latches, the lens door frame provides perfect alignment and accurate compression on the gasket.

Lamp socket (Mogul type) is held in place by an accurately formed support. Floodlight rotates on a trunnion, allowing 360° horizontal rotation, and yoke arrangement permits unlimited vertical adjustment. Floodlight may be locked in any position.

New Hot Water Generator

Oil-burning, fully automatic, the Agitair hot water generator recently announced by Air Devices, Inc., New York, is designed especially for marine hot water and heating service where light weight, efficiency, compactness, safety, automatic control, and simplicity are required.

The burner is fully automatic and foolproof. Diesel or lighter fuel oil is burned under positive pressure supplied by a low-speed motor.

The Agitair generator is down-fired, with a multiple pass over the heat-absorbing surfaces. Combustion occurs in a carborundum chamber through which the flame has a cork-screw travel. There are no negative drafts and no smoke, eliminating necessity for special stacks. The burner is adjusted before shipment to burn the correct amount of oil.

Takes Smell Out of Paint

Said to be equally effective with brush or spray operation, a small quantity of Ridsmel, liquid paint deodorant, may be mixed with any paint, varnish or enamel, eliminating usual odors completely.

Ridsmel is now being used in scores of war production plants and shipyards; its application is especially valuable when painting must be done indoors. It eliminates time-out and illness, absence due to allergies, nose, throat and eye irritations, and does not affect color, drying, or durability of finishes. One quart of the solution will effectively neutralize 200 gallons of paint, varnish or enamel. This product is also widely used in maintenance painting; its use allows normal activities and production to continue while premises are being painted. Ridsmel is manufactured by Holley Chemical Co., New York.

Ridgid Strap Wrench

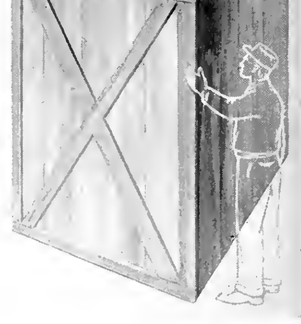
This new tool recently added to the Ridgid line is intended for better handling and protection of polished nickel and chrome pipe and tubing. It is made with strong I-beam handle and solid head, all in one piece, with a handy hang-up hole in the end. It is easy to attach and use, and is positive in grip. Special webbing strap of great strength is quickly removed for replacement by pushing out pin held by spring clips. This Ridgid strap wrench is made in two sizes: No. 2, capacity 1/8" to 2", 17" strap; No. 5, 1" to 5", 30" strap. Manufactured by The Ridge Tool Company, Elyria, Ohio.

Spike-Type Box Grab

The Palmer-Shile Co., Detroit, Michigan, have just announced a new Spike Type Box Grab, which they recommend for use in grabbing, holding and lifting large export boxes, heavy boxed machinery, or any similar boxed merchandise on which spiked grips may be used.

The gripper plates are fitted with replaceable cone-headed spike bolts. Four models are available, in capacities of 1000, 2000, 3000 and 4000 pounds respectively, and the heavier the load the tighter the hold. They may be used on boxes up to five feet wide. Chain length adjustable for high or low ceilings is supplied.

Spike type box grab.



The Brooks Equipment Corpora on of California has recently moved new and larger quarters in both in Francisco and Los Angeles in rder to facilitate the handling of the ompany's rapidly-expanding busi ess in this territory. The new quar rs in both cities provide greatly ılarged office space and ample stock oms for storing the large quantity universal joints and other products rried by the company.

Charles E. Neal, executive vice esident, announces that the com any has recently been appointed acific Coast sales representative for e Wiggins Quick Couplings, man- actured by E. B. Wiggings Oil ool Company, Inc., of Los Angeles. he coupling is designed to facilitate eatly the making of fueling connec ons in rough seas.

Another new line recently added the company is the Little Giant ortable Magnetic Drill Press for ieumatic or electric drills, manufac red by the Mechanical Research ompany, Portland, Oregon.

The new home and headquarters the company in San Francisco is cated at 636 Potrero Avenue, and e new Los Angeles headquarters is 1159 South Hill Street. C. F. Glas ell is branch manager of the Los ngeles branch, and Loren Hauser, rmerly with the Consolidated Steel orporation, Ltd., has recently joined e Southern California branch in a les and engineering capacity.

The company also maintains offices d stocks in Portland and Seattle to rve the shipyards and industries in e Northwest.

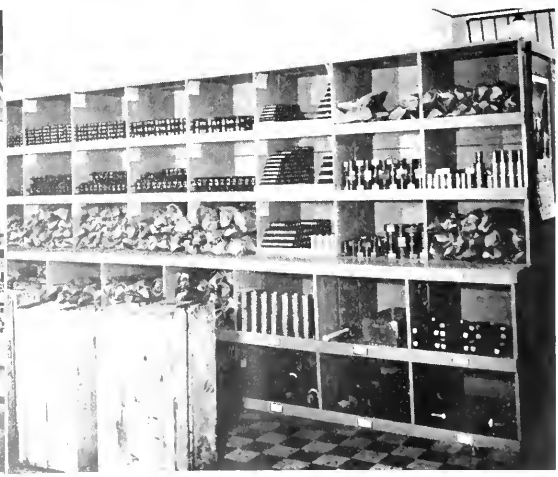
In New Quarters

Top of Page: San Francisco headquarters.

Right: Los Angeles branch.

Lower left: San Francisco stockroom.

Lower right: Los Angeles stockroom.



On the Ways —
SHIPS IN THE MAKING

G. E. Employees See Launching of Missouri by Television

The 45,000-ton, mightiest battlewagon of them all, the U. S. S. Missouri, slid down the ways at the Brooklyn Navy Yard while General Electric workers, who built the powerful propulsion units and other vital equipment for the formidable warship, witnessed the launching 150 miles away in the company's Schenectady plant. The employees gathered for "front row seats" before a tremendous motion picture screen.

At the launching only a few distinguished guests, naval personnel and shipyard workers witnessed the launching because of wartime restrictions and a desire to avoid interference with other work at the yard.

Miss Mary Margaret Truman, daughter of Senator and Mrs. Harry S. Truman of Missouri, sponsored the vessel.

The Missouri, fourth battleship of her class, is expected to be completed nine months ahead of schedule.

Detailed specifications of the Missouri cannot be disclosed for security reasons, but her main batteries of giant 16-inch guns, together with other armament of the latest type, will make her without question the most formidable battleship afloat. Her overall length of 880 feet is only 149 feet less than that of the U. S. S. Lafayette, formerly the French liner Normandie, recently salvaged from the North River.

China Envoy's Wife Christens Victory Ship

Combining the ancient Chinese invocation to the sea gods with the traditional American bottle of champagne, Madam Wei Tao-ming, wife of the Chinese Ambassador to the United States, christened the S. S. China Victory, a 10,000 ton Victory ship at the California Shipbuilding Company yard.

Mrs. T. K. Chang, wife of the Chinese consul at Los Angeles, was matron of honor at the launching.

CALSHIP'S FIRST VICTORY SHIP

First of a long line of Victory ships to leave the Calship building ways, the S. S. China Victory hits the water of Cerritos Channel after an impressive launching ceremony. Madame Wei Tao-Ming, wife of the Chinese ambassador to the United States, christened the vessel, and Madame T. K. Chang, wife of the Chinese consul in Los Angeles, was matron of honor.

TWENTY-FIFTH DESTROYER

Seattle-Tacoma Shipbuilding Corporation on January 29 launched its 25th destroyer, sending the 2100-ton Wren down the ways. Ensign Dorothy Field of the Waves, standing in the bow of the vessel with Sea-Tac employees, had the distinction of being the first woman to ride down the ways on a destroyer launched by Sea-Tac. She was the first Wave to be stationed at the yard.

Richmond Shipyard 4 Wins "T" Flag

Richmond Shipyard No. 4 of Rich mond, California, the "baby" of th Richmond shipbuilding activities, wa awarded a "T" flag by the U. S Treasury Department recently, i recognition of the response of its em ployees to the Fourth War Loan cal

Ninety per cent of the personn of the yard purchased bonds of th fourth loan, it was announced by E Massa of the Treasury Department i presenting the flag to A. B. Ordway vice president of Kaiser Cargo, Inc which operates No. 4.

January Shipbuilding Productio

The number of ships launched b United States shipyards rose to 277 with the addition of 124 new vesse during January, the Maritime Com mission reports.

The new vessels, totaling 1,204,73 deadweight tons, increased the mer chant shipping tonnage floated sinc Pearl Harbor to 26,625,263.

West Coast shipyards during th first month of the new year turne out 67 ships, representing 50.6 pe cent of the month's tonnage; Gu

ıst yards, 20 ships or 18.4 per t, and East Coast yards, 37 ships 31 per cent.

The largest producing yards in uary were the Permanente Metals rporation, which floated 20 Lib- y ships at its Richmond, Califor- . yards; Bethlehem-Fairfield Ship- ds, Inc., Baltimore, 12 Liberty ps; and the California Shipbuild- Corporation, Wilmington, Cali- nia, 11 Liberty ships.

The turn-out of military type craft and the shift from the Liberty emergency cargo vessel construction to the Victory ship and other long-range ships, all requiring considerably more man-hours, was cited as an explanation for the temporary decline in the number of ships delivered, as against the December record of 208.

The number and types of vessels built by all yards during January follows:

SHIPYARD	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.	3	Tankers
Bethlehem-Fairfield Shipyard, Inc., Fairfield, Baltimore, Md.	12	Libertys
California Shipbuilding Corp., Wilmington, California	11	Libertys
Concrete Ship Constructors, National City, California	3	Concrete Barges
Consolidated Steel Corp., Ltd., Wilmington, California	9	Special Types
Delta Shipbuilding Co., Inc., New Orleans, La.	3	Emergency Tankers
East Coast Shipyards, Inc., Bayonne, N. J.	1	Coastal Tanker
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.	2	Special Types
Gulf Shipbuilding Corp., Mobile, Ala.	1	C-2 Cargo
Houston Shipbuilding Corp., Houston, Tex.	4	Libertys
Ingalls Shipbuilding Corp., Pascagoula, Miss.	1	Special Type
J. A. Jones Construction Co., Inc., Brunswick, Ga.	3	Libertys
J. A. Jones Construction Co., Inc., Panama City, Fla.	1 2	Special Type Libertys
Kaiser Cargo, Inc., Richmond, California	1	Special Type
Kaiser Company, Inc., Richmond, California	1	Special Type
Kaiser Company, Inc., Swan Island, Portland, Oregon	2	Tankers
Kaiser Company, Inc., Vancouver, Wash.	4	Special Types
MacEvoy Shipbuilding Corp., Savannah, Ga.	1	Concrete Barge
Marinship Corp., Sausalito, California	3	Tankers
Moore Dry Dock Co., Oakland, California	3	C-2 Cargo
North Carolina Shipbuilding Co., Wilmington, N. C.	4	C-2 Cargo
New England Shipbuilding Corp., South Portland, Me.	6	Libertys
Oregon Shipbuilding Corp., Portland, Oregon	9	Libertys
Pennsylvania Shipyards, Inc., Beaumont, Tex.	1	C-1 Cargo
Permanente Metals Corp., Richmond, California	20	Libertys
St. Johns River Shipbuilding Co., Jacksonville, Fla.	3	Libertys
Southeastern Shipbuilding Corp., Savannah, Ga.	2	Libertys
Sun Shipbuilding & Dry Dock Co., Chester, Pa.	2 1 1	Tankers Special Type Coastal Tanker
Todd-Galveston Dry Docks, Inc., Galveston, Tex.	2	Special Types
Walsh-Kaiser Company, Inc., Providence, R. I.	1	Tanker
Welding Shipyards, Inc., Norfolk, Va.	1	Special Type
Western Pipe & Steel Co., San Francisco, Calif.		
	124	

Princess Juliana Sponsors Ship at Richmond

Royalty officiated at a launching ceremony for the first time in American history when a princess of a royal European family launched a Liberty ship at Richmond, California, on January 28.

Princess Juliana of the Netherlands Royal House of Orange sponsored the S. S. Jan Pieterszoon Coen, named in honor of a robust seventeenth century Hollander who helped to establish the Dutch East Indies colonies.

More than 100 Hollanders, members of the princess' entourage and residents of the San Francisco Bay area, attended the ceremony, which was held at Shipyard No. 1 of the Permanente Metals Corp.

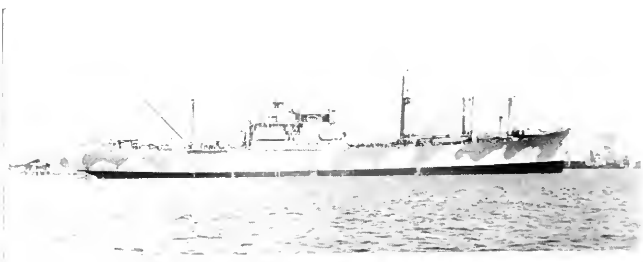
A note of interest during the christening was when the princess swung the bottle at the ship, failed to break it and somehow dropped it. Norris Nash, public relations director of the shipbuilding company, hastily grabbed the ribboned bottle, but also failed to smash it. Quickly Charles Runyon, uniformed guard on the platform, snatched the bottle and flung and crashed it on the fast-moving hull.

Todd Shipyards Corporation Record

Todd Shipyards Corporation, its wartime stride lengthening rapidly in 1943, has constructed a total of 510 vessels since Pearl Harbor, of which 380 were built last year, John D. Reilly, president, recently disclosed. The total as of December 31 was 491 ships.

In addition, five huge Todd drydocks and repair yards on three coasts have repaired or converted thousands of vessels of all types and sizes, including fighting ships, supply craft and transports, boosting to more than 30,000,000 tons the amount of shipping sent out into the seaways of the world by the corporation in furtherance of America's war effort.

Nine yards of the Todd organization, employing 130,000 workers, are busy 24 hours a day, building, repairing and converting for the Navy, the Army, the Maritime Commission, and allied governments. They have built, repaired or converted nearly 9000 vessels since Pearl Harbor, ranging from fishing boats to the Normandie, world's largest passenger liner.



RECEIVES PRESIDENTIAL CITATION

The twice-torpedoed Navy cargo ship Alchiba, equipped with Cooper-Bessemer diesel generating sets, and the first vessel of this type to receive presidential citation for outstanding wartime service in the South Pacific.

(Official U. S. Navy photograph)

Names of Some of the First Victory Ships

Designation of names for the first eleven sister ships of the S. S. United Victory, first in the Maritime Commission's fleet of Victory ships honoring the United Nations, were announced recently.

Letters informing the embassies of the assignment of the names honoring their respective countries were sent by Rear Admiral Emory S. Land, chairman of the U. S. Maritime Commission.

Czechoslovakia Victory, Poland Victory, Britain Victory, Norway Victory, Luxembourg Victory, Netherlands Victory and Belgium Victory will soon be sliding down the ways at the yard of the Oregon Shipbuilding Corporation, Portland, Oregon.

China Victory, launched late in January, was the first Victory ship to leave the ways of the California Shipbuilding Corporation. Others to be built by this yard will be Greece Victory, USSR Victory and United States Victory.

Sturdy Liberty Pulls Through!

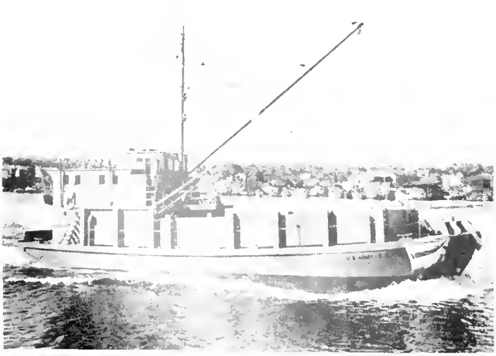
Workers of the North Carolina Shipbuilding Company, Wilmington, N. C., should be justly proud of the Liberty ship they built, James Iredell, now back and unconquered by a submarine attack, bomb hits, and flames which raged for 68 hours in her hold alongside 6500 tons of high-octane gasoline, according to a War Shipping Administration release. Her escape from destruction is regarded as additional proof of the sturdy design and construction of these "workhorses of the sea," which are lifelines of our fighting forces overseas.

Under command of Captain Alfred L. Jones, the James Iredell sailed in convoy through the straits of Gibraltar, and shortly afterwards U-boats attacked the convoy and struck a hit on a ship filled with high explosives which was just ahead of the Liberty. The repercussions were so great that the James Iredell was damaged and 15 soldiers who were aboard were seriously injured.

After discharging her cargo at Palermo, Sicily, and taking on aviatio gasoline, the ship started for Naple Shortly after her arrival, Germa bombers raided Naples at night. Th first bomb which struck the shi crashed through the number tw hatch and started a fire in the hol where part of the gasoline was store Fire raged and, while the crew fough to control it, two more bombs ex ploded in the same hold. When th flames seemed beyond control, Cap tain Jones gave orders to abando ship. Three Navy fireboats arrived t battle the blaze when more explosior threatened her bulkheads. It was a most three days and nights before th fire was extinguished.

Emergency repairs were made b Army welders at Naples, and agai at Oran, making the vessel seaworth for the return voyage.

BARGE FOR THE ARMY



Recently launched U. S. Army barge BSP 869, 88' x 27' x 7', powered by two Caterpillar diesel D13000 engines to drive two 3-blade propellers at 460 rpm. Average speed about 9 knots. Many of these barges have seen service in Pacific waters for the Transportation Corps, Army Service Forces, under most severe weather conditions.

Early American Naval Hero Honored

The third destroyer bearing th name of James C. Jarvis, U. S. N., 13 year-old midshipman, who displaye outstanding heroism and devotion t duty in 1800 during a battle betwee the United States frigate Constella tion and the French frigate Venge ance, was launched from the yarc of the Seattle-Tacoma Shipbuildin Corporation in Seattle on Februar 14.

The first Jarvis, a vessel of 75 tons displacement, completed in 191 was struck from Navy lists in 1934.

The second Jarvis, built in the Pu get Sound Navy Yard in Bremertor was lost by enemy action off Guada canal in 1942.

The new Jarvis was christened b Mrs. Harold Burkitt of Portlanc Oregon, daughter of Rufus C. Ho man, United States Senator fro Oregon.

Calship Delivers 196 Merchant Ships in 1943

A record of eight ships delivere in the last five days of Decembe closed California Shipbuilding Co poration's 1943 schedule with a tot of 196 merchant ships delivered du ing the year, company officials ar nounced. The yard's output, durin the past year, equaled one-ninth c the total national deliveries to th Maritime Commission.

Calship's December total of 19 Lil erty ships and four Liberty tanke topped its June record of 20 ships i one month.

Liberty Ship to Honor Late George A. Pope

A pioneer leader in the development of the American Merchant Marine on the Pacific Coast, the late George A. Pope, former chairman of the board of Pope & Talbot-McCormick Steamship Company, was honored at the Kaiser yard in Richmond during the month of February, when a new Liberty ship bearing his name was launched.

Veteran of Civil and Mexican Wars Honored

A Twelfth Naval District launching at the plant of the Bethlehem Steel Company, Shipbuilding Division, Terminal Island, early in February, named a new destroyer after the late Commodore Reigert B. Lowry, U. S. N., veteran of the Civil and Mexican wars. His great-granddaughter, Miss Ann Lowry of Burlingame, California, daughter of Captain George M. Lowry, Operations Officer of the Western Sea Frontier, was designated by the Secretary of the Navy to sponsor the new destroyer.

Washington's Birthday Launching

The launching of the S. S. Cape Tryon at the Wilmington Shipbuilding Division, Consolidated Steel Corporation, Ltd., on February 22 was the 76th vessel to be launched from the corporation's yard. The ship is named for a point on Prince Edward Island, Canada. Mrs. Cortlandt T. Hill, wife of the president of Pacific Railway Equipment Co., Los Angeles, was sponsor at the ceremonies.

Consolidated has launched a total of 685 vessels from its six plants. Of these vessels, 635 have been delivered to the U. S. Navy and U. S. Maritime Commission. These vessels include destroyers, escort vessels, mechanized landing craft, barges, frigates, Navy transports, Navy hospital ships, and C-1 cargo and passenger vessels.

FBI Operatives Gather for Launching

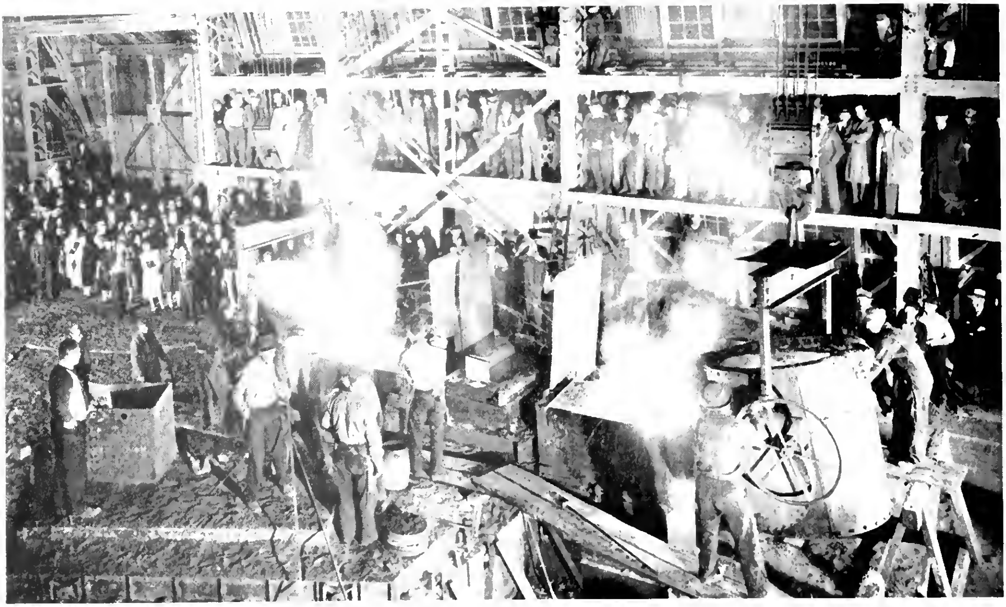
Members of the FBI gathered in numbers shortly before midnight one night early in February at Shipyard No. 2 of the Permanente Metals Corporation in Richmond. The occasion was the launching of the S. S. Percy E. Foxworth, a Liberty ship named for the famous FBI assistant to J. Edgar Hoover. Mr. Foxworth was killed last year in a plane crash in Dutch Guiana while on a confidential mission. His widow, Mrs. Percy E. Foxworth of New Orleans, La., was sponsor, and Mrs. Nat Pieper, wife of special agent in charge of FBI, San Francisco, was matron of honor.

MARINSHIP LAUNCHING

A bottle of California champagne breaks against the bow of the tanker S. S. Mission San Carlos, which was launched at Marinship, in Sausalito, Calif., on February 12. Swinging the bottle is Mrs. J. H. Pomeroy, sponsor. Others are (left to right): Mrs. Robert Pomeroy and Mrs. William Pomeroy, daughters-in-law of the sponsor; Rev. Lloyd A. Cox, Rector of Christ's Church, Sausalito; J. H. Pomeroy, director of Marinship Corporation and president of J. H. Pomeroy & Company, prominent Western contracting firm; Russell Fox, Marinship launching engineer; and Mrs. David N. Plant, matron of honor and daughter of Mr. Pomeroy. *(Photograph courtesy Marinship)*

ASSIGNED TO ACTIVE DUTY

The U. S. S. Knoxville, a frigate escort vessel in its most modern conception, heads for active duty with the Navy's fighting fleet. The trim 303-foot twin screw warship, one of a fleet of eight being built at the shipyards of the Leathem D. Smith Shipbuilding Company, Sturgeon Bay, Wis., was one of the first of its type to be launched in the country, and is the first to be delivered complete in every respect to the Maritime Commission, for whom the vessels are built. After accepting the ships, the Commission signs them over to the Navy for operation.



Guests at the "M" ceremony witnessed the pouring of the 385th and final Liberty ship stern frame. The company is now pouring stern frames for the faster Victory ships.

Steel Foundry Honored

A recent special ceremony at the Columbia Steel Casting Company at Portland, Oregon, jointly celebrated the presentation to the firm of the Maritime Commission "M" flag for outstanding production of stern frames and other large castings, and the pouring of the final 15-ton Liberty ship stern frame before the company changed over to casting frames for the faster Victory ships.

In his opening remarks, Harvey F Dick, partner of the company, who was master of ceremonies, paid tribute to 24 men who have been with the company for more than 25 years; to ten men who are veterans of more than 30 years; and to Hobart Bird, general manager, who has been employed by the firm for the past 25 years.

Following the colorful ceremony, the guests witnessed the pouring of 44,000 pounds of molten metal for the 385th Liberty ship stern frame. Columbia Steel Casting has poured 385 stern frames in an equal number of working days. The company was the first in the United States to deliver a stem casting and rudder stock for a Victory ship. These were delivered to Oregon Shipbuilding Corporation at Portland.

Prior to the war the company had never poured castings larger than three and a half tons, but is now pouring stern frames up to 23 tons. A new electric furnace with an 80,000-pound charge has recently been installed, which, with the original 50,000-pound furnace, is said to place the company among the largest electric casting capacity foundries of the West Coast.

Holding the "M" pennant which was presented to Columbia Steel Casting Company for an outstanding production record in pouring stern frames and other large castings are Lewis R. Banks, partner of the company; Allen D. MacLean, assistant director of the production division, U. S. Maritime Commission, Washington, D. C.; Harvey F. Dick, partner of Columbia Steel Casting; and Charles E. Walsh, Jr., director of procurement, U. S. Maritime Commission, Washington, D. C.

Navy Approves Fast New Seawater Desalter

Briquets of secret chemical, developed by chemists of the Permutit Company, are carried by over-water fliers. Note wrapping of cardboard, foil and pliofilm to prevent damage from salt air and water in case of submersion.

A new chemical that takes the deadly salt out of seawater in twenty minutes and permits a flier to carry the makings of a fourteen-day supply of life-sustaining drinking water in his rubber life-raft has been recommended by the Naval Medical Research Institute, and is now in production, climaxing more than a year of all-out research in which innumerable de-salting devices have been invented and tested. The new chemical "de-salter," which weighs only three and a half pounds and converts over fourteen pints of seawater into drinking water, was developed by research chemists of the Permutit Company of New York, who succeeded in solving a problem that has baffled scientists for more than a century.

The new chemical, which is carried in the form of briquets the size of a small candy-bar, is the result of many months of research by Permutit chemists. When dropped into a plastic bag filled with seawater, the chemical quickly absorbs the dissolved salts, permitting them to be filtered out as the flier sucks the water through a plastic tube. Each briquet weighs only one-sixth as much as the drinking water it produces and takes up only one-tenth as much space, thus keeping within all-important plane-loading limits, which are computed almost to the last ounce and cubic inch.

As a result of independent tests, American Airlines engineers have adopted this seawater de-salting process for all over-water cargo and passenger flights, and had recommended it to other airlines operating flights under the Air Transport Command, which flies vital war goods and personnel to and from war theaters in Europe, Asia, Australia and Africa. The laboratories of American Airlines compared various types of stills and chemical processes and conducted a series of raft tests off Cape Fear, North Carolina, which confirmed the findings of the Navy Department.

In its first public demonstration in the Atlantic Ocean recently, the new de-salter converted a pint of seawater into drinkable water in less than twenty minutes. The seawater was scooped up in the transparent bag and a briquet was dropped in. The bag was sealed and shaken and the chemical and absorbed salts were retained by a cloth filter as the water was sucked out. A cord fastens the kit and the drinking bag securely to the raft or around the user's neck to prevent loss in case the raft upsets.

Briquets and bag, enclosed in water-tight plastic bag, weigh 3½ lbs., are rolled into deflated life-raft pack during over-water flight. Raft pack is either seat-cushion type attached to flier or is stowed in cockpit, readily available.

Attention has been focused on the problem of water-supply for life-rafts by the vast amount of over-water flying and fighting, especially in the Pacific war zones, where two and three-week raft "squattings" have become commonplace. The Rickenbacker and Dixon-Aldrich-Pastula sagas describing the tortures of thirst aboard life-rafts showed that lucky catches of fish, birds and rain-water were all that prevented their death from thirst. Medical opinion holds that water is more important than food in sustaining life, for dehydration of tissues is usually fatal.

Chemical desalting takes place as briquet breaks up and converts dissolved salt into filterable sediment. Process known as "ion-exchange" is well known in industrial chemistry, but composition of briquet is restricted military information.

Selection of White Oak Bending Stock

by Joseph L. Stearns

White oak, second growth, rapid, approximately 5 rings to inch.

(U. S. Forest Service, Forest Products Laboratory photos)

Commercial white oak varies to a certain extent in its physical properties. This is due to differences in climate, altitude, soil characteristics and other natural factors affecting tree growth.

These differences, or factors, are not always delineable on a map, since one particular tree may yield dense, tough wood, while another growing in the same forest may be soft and bashy. Certain regions may contain a higher percentage of dense, tough wood than others. But, because the extremes are encountered so frequently in practice, it cannot be assumed that all the oak from a certain region will meet the requirements for bending oak. Each piece must be examined by the inspector, regardless of its source.

It is a matter of great significance to the Navy Department, especially at this time, that all suppliers of white oak bending stock become thoroughly versed in the procedure for selecting lumber for this purpose.

There are many different species of oak cut for lumber in the U. S. These are divided into two general groups, white oaks and red oaks. Fundamental characteristics of the groups are shown on the following page.

Characteristic No. 6 is the most reliable means of identification. Unless specifically authorized to the contrary, only white oaks will be permitted by the Navy Department for bending.

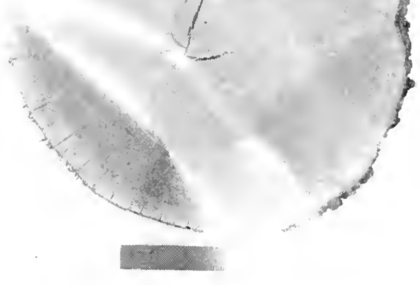
Good white oak bending stock is found in every region where oak is manufactured, although in some areas a larger percentage of the total production will qualify for bending than in others. Generally speaking, in a region where oak grows rapidly there are better possibilities for obtaining this material than where the rate of growth is slow. Young stands of white oak growing under favorable conditions are more likely to yield tough, dense wood than old virgin timber.

It has been found that white oak containing not less than 6, and not more than 10, annual rings per inch is the most successful type for bending. In addition, it is stronger in service. Such oak is ordinarily dense, heavy and tough. There are exceptions, however, and one should never rely entirely upon ring count.

There are four fundamental points to consider in grading white oak bending stock. These are:

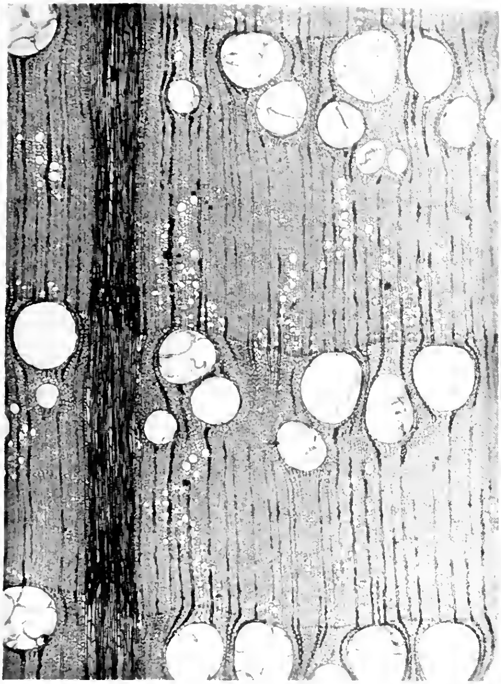
(1) **Straightness of grain.**

This is a very important requirement in bending oak. A piece may be dense, tough and free from defects; but if it contains cross or spiral grain, all these other good qualities are nullified at once. The **grain should not deviate from a straight line more than 1″ in 15″ of length,** includ-

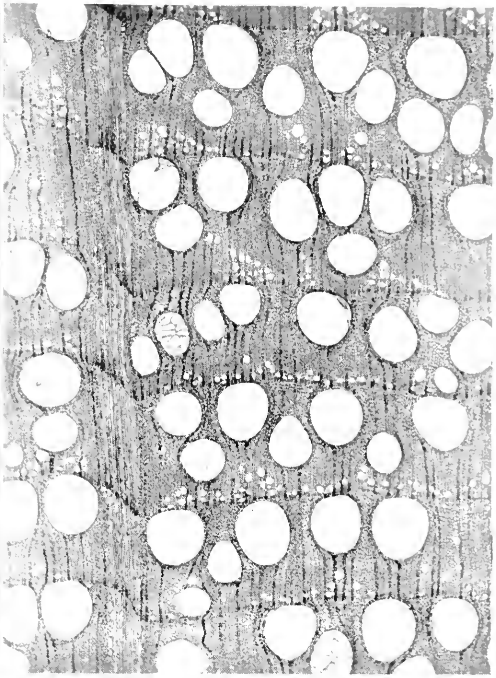


White oak, old growth, approximately 15 rings to inch and upwards.

The author is Forest Products Engineer, National Lumber Manufacturers Association



White oak (*quercus alba*) cross section X50. Rapid growth.



White oak, cross section X50. Slow growth.

ing local irregularities such as are found in the vicinity of knots or burls.

(2) **Number of annual rings per inch.** One of the best indications of strength and toughness is the number of annual rings in white oak. These should be from 6 to 10 per inch measured along a straight line perpendicular to the rings.

(3) **Density.** A good piece of bending oak must be dense. That is, its weight, or specific gravity, must be above the general average for white oak. Experience indicates that the most practical method for determining density is ring count. In a test of several hundred samples of white oak taken from widely scattered mills in Eastern U. S., it was found that only 27 percent of all the samples had 10 rings per inch or less; 50 percent had 14 rings or less; and 60 percent had 16 rings or less. This means that under the present specifications only about one-fourth of all U. S. white oak will qualify for bending as far as the 6-10 ring count is concerned. **However, owing to the great demand for bending oak to fill war needs, the Navy Department will accept stock up to 15 rings per inch.** The 1944 National Hardwood Lumber Association grade rule for Bending Oak will carry this requirement.

Although not required by Navy specifications, the specific gravity may be roughly determined by a simple method evolved by the U. S. Forest Products Laboratory. This consists of

CHARACTERISTICS OF OAK TIMBER

White Oaks	Red Oak
(1) Leaf lobes rounded.	(1) Leaf lobes bristle tipped.
(2) Acorns mature in one season.	(2) Acorns mature in two seasons.
(3) Vessels in heartwood contain abundant tyloses.*	(3) Vessels in heartwood have few tyloses.*
(4) Color of heartwood tends to be tan or light brown.	(4) Color of heartwood is decidedly reddish or pink.
(5) Freshly cut heartwood has a characteristic tannic odor, not unpleasant.	(5) Freshly cut heartwood has a sour, usually unpleasant odor.
(6) Pores in the summer wood† are very small and too numerous to be counted even with a hand lens.	(6) Pores in summerwood† few, large and open. Can be counted under a hand lens.

* Tyloses are the froth-like deposits inside the [illegible] They look somewhat similar to wrinkled cellophane when observed [illegible] magnifying glass. One exception in the white oak group is Chestnut Oak [illegible] contain relatively few tyloses, nevertheless it is an acceptable [illegible]

† Summerwood is the dense area between [illegible]

cutting a sample of the wood in question into a one-inch square, 10" long. The piece should be planed on all four sides to exact dimension, then dried in an oven until it ceases to lose moisture. This piece should then be floated in an upright glass cylinder full of water. An ordinary graduated measuring glass is recommended, but in its absence a piece of ordinary iron pipe about a foot long will suffice. Plug up one end and fill with water. Place the 10" oak square in the water, lowering it very carefully until it floats. Remove the piece, and with a pencil draw a line at the highest point reached by the water. In good dense stock this line will be 5.5 inches or more from the bottom, or, in other words, 55 per cent of the piece will be wet. Most of the dense material will run between 5.5 and 6.5 inches, indicating a specific gravity of between 55 and 65 percent. After making a few tests of this kind, one can judge the specific gravity of white oak closely enough without making further tests. The object in ascertaining density is to eliminate the lightweight, so-called "punky" or brashy stock. Most oak having from 6 to 10 rings per inch is sufficiently dense, but occasional pieces of such wood have been found to be underweight. This may be due to incipient decay, dote, or natural deficiencies arising from unusual growth conditions. The summerwood pores in such wood are often visible without magnification. This wood should be rejected, even though perfect in other respects.

(4) **Defects.**

Since bending oak is subjected to unusually high stresses during the bending operation and through out its period of service, it must be reasonably free from defects. The type and extent of allowable defects are shown as follows:

Knots: The wood may have one knot, of not over ¾" diameter, within 12" of either end.

Season checks: These must not exceed ½" in depth, nor 12" in length.

Small Pin Worm Holes: Not over 3 in any 6 inches of length will be allowed. Not over 25 per cent of the pieces may contain such defect.

Sapwood: Bright sound sap will be allowed to the extent of 1" on one corner or its equivalent on two corners running the entire length on 8 ft. pieces or 2/3 the length on longer pieces.

Heart center, wane, decay and shake: None permitted.

The Navy Department specifications require that bending oak be cut from live timber only.

It is not the intention of the Navy Department to make unreasonable demands upon oak manufacturers in obtaining white oak bending stock. The construction of boats has always required a stronger, tougher white oak than, for example, cabinets or furniture. Bending oak must not only survive the bending operation in the boat shops without splitting, breaking, or crushing, but, what is more important, it must be tough enough to "take it" when the boat is pounded by heavy seas or exposed to the many other forms of rough treatment to which Navy boats are invariably exposed in time of war.

The cooperation of all oak producers in complying with the Navy specifications will speed the wood boat construction program by eliminating (1) delays in the inspection, (2) replacement of unsuitable stock, and (3) repairs on boats occasioned by sub-standard materials.

Marine Progress In 1943

(Continued from page 73)

brains of the industry, fitting commercial needs. Set at what are considered the best practices at the time of their establishment in the "Rules," these standards are not frozen—they are set up for general use as a guide and can be changed from time to time as changes in the art demand. It is the duty of the classification society to maintain them sufficiently flexible so that where a change is desirable it may be incorporated and dealt with, provided the strength and safety of the ship is not impaired.

Welded Ship Failures

After the Schenectady casualty, immediate steps were taken by this Bureau with the primary object of educating shipyard personnel and others concerned by the allocation to each district of certain of our younger surveyors who had made a special study of welding problems, with instructions to devote their whole time to welding activities. A Sub-Committee on Welding composed largely of the leading welding engineers in our established shipyards was appointed to assist the Bureau Technical Staff and to ensure the fullest discussion and interchange of opinion with regard to welding matters. In collaboration with the Maritime Commission, a careful study was made of the structural details of these ships, as it was apparent that certain details which experience had shown to be eminently satisfactory for riveted construction were not necessarily so for welded ships. As a result of this study, measures were taken to improve certain structural details, especially at hatch corners. These improvements were applied as soon as possible to vessels under construction and to existing ships as opportunity afforded.

We have been free from serious service troubles on our welded ships built prior to the war emergency, so that it is fair to conclude that war conditions have been a contributing factor with respect to the lack of experienced welders, and, what is even more important, skilled supervisors and leadermen fully alive to the importance of strictly adhering to the best practice as regards welding technique, procedures and sequences. Some of the welders engaged in production work in our shipyards today are not experienced in the proper sense of the word, and the fact that a man has been able to pass some simple tests, which should really be con-

(Continued on page 126)

These seamen gathered around the fireplace of the dedicated hayloft include: Oiler, Chris Rasmussen; Bo's'n, John Persson, who was torpedoed in World War I and again recently; Bo's'n Harvey A. "Windy" Winderweedle, the man who accepted the key to the annex; and Second Mate Don Cameron, who has been through a couple of torpedoings.

"Millsport Haven" Dedicated to Seamen

"Millsport Haven," a mansion like stable, one-time home for the well groomed horses and fine carriages of the Darius Ogden Mills estate in Millbrae, some fifteen miles down the peninsula from San Francisco, is today a comfortable home for convalescent seamen of the Merchant Marine.

In conjunction with the anniversary celebration of the Merchant Seamen Rest Home, the former 42-room main house, known to the country side as the "mansion of magnificent mirrors," dedication ceremony was held for the opening of the best-furnished hay loft. This redwood paneled building is two storied with the loft bunking 40 men and the main floor, which was the carriage room, is shown in the photograph above, a cozy, gayly decorated social hall with comfortable lounging facilities. The wide brick fireplace is a new addition to the annex.

During the presentation of the annex, at which over 400 guests attended, Charles L. Wheeler, executive vice president of Pope & Talbot, steamship operators, and treasurer of the United Seamens Service, made the dedicatory speech and handed the old bronze key of the former carriage house to Bo's'n "Windy" Winderweedle, who represented the whole U. S. Merchant Marine. Musical entertainment was furnished by the Merchant Marine Cadet School's orchestra of San Mateo, led by Lieut Ted Weems, former well known orchestra leader.

Bilge

Greetings! Caught here are L. H. Connors, Mott Soares, and Leo New.

A record breaking attendance — 538 members and guests gathered at Biltmore Hotel in Los Angeles on the evening of February 12, to attend the sixteenth annual banquet held by The Bilge Club of Los Angeles Harbor.

The successful banquet was a real repast and the gathering all voted the entertainment features of the affair were the best ever arranged.

Special word of appreciation goes to The Bilge Club president, J. M. Costello and to his capable chairmen, John Marshall, Attendance; R. W. Decker, Decorations; T. W. Buchholz, Dinner; E. L. Archibald, refreshments; E. L. Ryan, Entertainment; E. J. McKee, Reception; A. F. Boro, Secretarial; and Win Rash, Financial Chairmen, the boys "who put it over with a bang."

To the officers and committee chairmen of the famous organization "Pacific Marine Review" extends a big cheer for a job well done.

Club Banquet Attendance Record Shattered!

16th Annual Banquet Held in Los Angeles, Calif.

Upper photos, left to right: J. C. Irwin, Jr., R. L. Sullivan, E. W Hannay, A. O. Pegg and J. S. Sides.

Group gathered below are: P. F. McClung, E. C. Obenheim, H. K. Winterer and A. W Mount.

Upper view shows the Service boys that raised the colors behind H. J. Summers, Lloyd Moore and John Eidam.

Below: The happy group enjoying the entertainment include Carl Fennema, D. S. Koontz and Robert Dewey.

Among those at the Banquet seated [illegible] the speakers' table are left to right: T. W. Peters, A. O. Pegg, H. J. Summers, L. T. Moore, Dan [illegible] R. Pegg, T. W. Forester and Bilge Club President J. M. Castella

Flying Hero Guest At Mariner's Club

Captain James Swett tells how good it feels to be "back home" from the South Pacific battle area.

Father George Swett expresses pleasure at the opportunity of having his son James on hand.

Captain James Swett, fighting Marine Corps flier, who set an unusual record when he downed seven Jap planes during his first encounter with the birdmen of Nippon, was guest of honor at the February meeting of the Mariner's Club of California. Captain Swett is the son of George Swett, who heads the well known San Francisco marine supply firm.

Although the young flier did not recount any of his history making experiences, Captain Swett expressed pleasure at being able to be on hand to renew many old acquaintances at home.

The luncheon program included a showing of two sound pictures, the first, showing parts of the battle of the Bismarck Sea, and the second, showing the United States Marines' capture of Tarawa.

President Frank DePue announced committee members for the year and then read a thankful acknowledgment of the club's contribution of $100 to the Oak Knoll Naval Hospital cigarette fund.

At pennant presentation to Monarch Forge & Machine Works, Portland, left to right: Carl W. Flesher, regional director of U. S. Maritime Commission; Frank Wolff, William Richter, and Charles J. Hirschbuhl, president of firm.

Portland Forge Firm "M" Award

The Monarch Forge & Machine Works of Portland, Oregon, was awarded the "M" pennant at special ceremonies February 16. The pennant was presented to Charles J. Hirschbuhl, president of the company, by Carl W. Flesher, West Coast regional director of the U. S. Maritime Commission.

The firm's first contract was with Willamette Iron & Steel Corporation for the production of reverse shaft assemblies, air pump beams, throttle valves and relief valves for Liberty engines. The firm then began delivering identical items to the Iron Fireman Manufacturing Company. In addition, Monarch has completed contracts for cargo boom fittings, rigging equipment, blocks, and built oxygen compressors. At present, the plant is working on rudder bearings, roller chocks, roller fair-leads, davits, rudder pintles, anchor windlasses, capstans, and steering engines.

War Film Shown at Meeting

During the February luncheon meeting held at the Biltmore Hotel, Los Angeles, February 16, by The Propeller Club of the United States, Port of Los Angeles - Long Beach Chapter, members saw a powerful, factual and interesting motion picture entitled "War Department Report."

This is the film the Under-Secretary of War has urged that all organizations see, pointing out that after its showing, greater appreciation will be felt of the magnificent accomplishment of our military forces

"M" Goes to Packing Firm

During the present emergency the C. Lee Cook Manufacturing Company of Louisville, Ky., makers of packings for marine engines since 1888, have supplied engine builders with packings in quantities sufficient to equip over 5,000,000 h.p. of marine engines. This includes approximately 50 per cent of the Liberty ship engines, along with engines going into coasters, aircraft carriers, submarines, escorts, corvettes, ore carries, tankers, and many other ships of special types

In recognition of this production, the company was awarded the highly valued "M" pennant at ceremonies held January 22, at the company plant. The pennant for meritorious production was presented to the firm by Chas. E. Walsh, Jr., Director of Procurement, and Howard C. Fulwiler, Division of Public Relations, of the U. S. Maritime Commission, who came from Washington to make the award.

Army-Navy "E" presentation ceremony held December 17, 1943, of the C. H. Wheeler Mfg. Co. Plant, Philadelphia, Pa.

Barrett & Hilp Belair Shipyard Wins "M" Award

Notification by wire of the award of the Maritime Commission's "M" pennant to Belair Shipyard in South San Francisco was announced by J. F. Barrett and H. H Hilp, partners of the construction firm, during launching ceremonies for the seventeenth concrete barge, The Barite, on February 18. In his wire, Rear Admiral Howard L. Vickery, Chairman of the U. S. Maritime Commission of Awards, stated that the honor has been paid to Belair in recognition of "outstanding production achievement in concrete ship construction."

A Visit Through Mars

A tour through Mars—the Navy's largest commercial flying ship, highlighted a recent inspection visit to the Naval Air Center, Alameda, California, by representatives of the Naval Affairs Committee of San Francisco Bay Area, Chamber of Commerce, early in February.

The party which made the tour included: E. J. McClanahan, chairman, San Francisco Chamber of Commerce Naval Affairs Committee; Oscar J. Beyfuss, Richard D. Brigham, A. J. Dickie, Chalmers Graham and Wm. L. Montgomery, of the San Francisco Chamber Committee; Noa S. Gayle and Fred J. Oehler from the San Jose Chamber of Commerce; and Louis J Breuner, Otto H. Fisher and E. H. Hammond from the Oakland Chamber of Commerce.

Sales Coordinator W. E. Foote (left) of Littlefuse, Inc., El Monte, Calif., and Chicago, Ill., is shown here with the company President E. V. Sundt

William A. Foote Becomes Sales Coordinator

The appointment of **William A. Foote** to be sales coordinator of Littelfuse, Inc., El Monte, California, and Chicago, Illinois, brings a man of exceptional qualifications to the company's staff.

This business career includes the presidency and general sales management of the Wingfoote Petroleum Company, affiliation with the Standard Oil Company of New York as Marketing Counsel, and national directorship of sales of the Deoxolin Chemical Corporation.

Fairbanks, Morse officials and guests at the head table include, left to right: George E. Noe, Pacific Bridge Company; H. W. Brown; Lt. Col. E. B. Wolford, T. C.; Roger M. Murray; Col. Robert H. Morse, president; Henry J. Barbour; Robert H. Morse, Jr.; F. J. Bennett; Frank J. Dowling, Pacific Bridge Co.; Geo. W. Niven; P. S. Pell, of P. S. Pell & Co., Honolulu, T. H.

A battle between the tenors and baritones suggests itself in this shot caught during the banquet.

Jack Radford (left), field engineer, Marine Sales of the San Francisco Branch, was responsible for the multitudinous details of the banquet and entertainment.

Colonel R. H. Morse, president of Fairbanks, Morse & Company, well-known machinery manufacturer of Chicago, Illinois, presented the President's Cup to Roger M. Murray, branch manager of the San Francisco office, at a dinner held at the Sir Francis Drake Hotel in San Francisco on January 28.

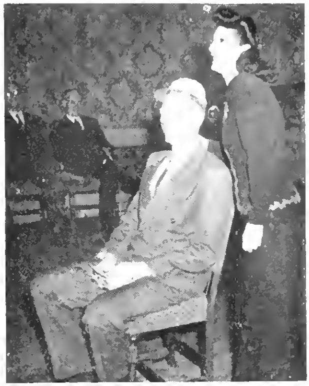
In presenting the cup, the company's national award given by the president to his branch office with the outstanding sales record for the year, Colonel Morse predicted a bright future for the Pacific Coast industry. He said: "I believe the Pacific Coast is well on its way to becoming a major factor in industrial production. A production not based on war needs alone but founded solidly on the natural economic advantages of the area. Many signs point to this. The growing population, the quick access to important portions of the world market, the availability of raw materials and many others."

The trophy, a huge silver cup, was presented to the firm's San Francisco branch manager, Roger M. Murray, before a group of 75 field engineers and invited guests. F. J. Bennett was honored as the high salesman whose name was inscribed on the cup. This is the first time that the trophy has been west of the Rockies, but it is evident from the executive's address that he believes the Pacific Coast area will become more important in the nation's business life, not only during but after the war.

San Francisco Branch Wins President's Cup

Others from the corporation head quarters' office who attended the presentation were: R. H. Morse, Jr., general sales manager, Henry J. Barbour, manager of sales promotion and public relations, George M. Niven, the former Seattle branch manager, and Harry W. Brown, manager of the firm's Los Angeles branch.

Fairbanks, Morse & Company has been devoting all of its capacity directly or indirectly to war material production. Diesel engines comprise the greater part of the firm's total business, and the U. S. Navy has been the Diesel Division's largest single customer. A special engine designed for the Navy's use in U. S. submarines has been largely responsible for the huge sinking of Japanese tonnage which has been carried on by such famous submarines as the Flying Fish, the Wahoo, the Trout, and many others. Also, the company is building diesel engines for the Army Transport Service for use in cargo ships and tugs, for the Maritime Commission, Coast Guard, and other war agencies.



The Ventriloquist Act stole the show with Howard Oxsen of San Francisco Branch, aiding and abetting.

The President's Cup presented by Col. Robert H. Morse to Roger M. Murray, San Francisco Branch of Fairbanks, Morse & Co.

Left to right: F. J. Bennett, honor field engineer; Geo. W. Niven, manager, Montreal Branch (former manager, Seattle); Col. Robert H. Morse, president; Roger M. Murray, manager, San Francisco Branch; Robert H. Morse, Jr., general sales manager; H. W. Brown, manager, Los Angeles Branch; and Henry Barbour, sales promotion manager.

U. S. West

The group on the left includes Machinery Inspectors at Marinship Corp., Sausalito, California. Front row: A. Falconer, C. E. McKay, J. A. George, L. J. Mengula, Principal Machinery Inspector; F. W. Hamann and C. Emmick. Standing: E. T. Emerson, L. G. Steven, M. W. Hart, G. Noyes, G. Cronk, F. A. Lewis and W. P. Cubitt.

Hull Inspectors, Richmond Yard One, Permanente Metals Corp.

Machinery and Electrical Inspectors, Richmond Yard One, Permanente Metals Corp.

Front row (left to right): Jeffrey Strauss, William Hockett, Jess Ballard, Mary L. Robison, Doris Wright, Sophie Rodda, Travers Laird, Rupert Hopper, John Freshwater and John Bush. Second row: Oren Said, Charley Shepler, John Ross, John Hamilton, Principal Hull Inspector; Jack Hamby, Senior Hull Inspector; Francis McSherry, Norman Morton, and Arthur Stevens. The young ladies comprise the secretarial force for the USMC inspectors.

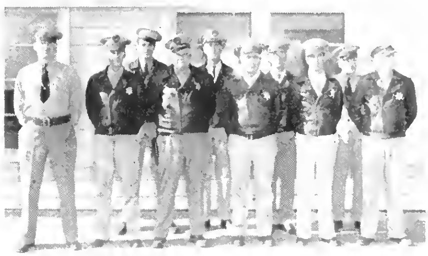
Front row (left to right): James Oliotti; Roy Payne; Carl MacWilliams, Senior Electrical Inspector; Holman Lenhart; secretaries, Mary Robison, Doris Wright and Sophie Rodda; James Dunn, Senior Machinery Inspector; George Avan; John X. Hutchings; Robert Buley and Lloyd Abrahams. Second row: Tom Kurpieski; Homer Cosad-; Samuel McCollum, Fred Steffen and Andreas Nielsen. Louis S. Eakins, Principal Machinery Inspector, was absent at the time his photo was taken.

Hull Inspectors at Marinship Corp., Sausalito, Calif. First row (left to right): F. Fulwider, G. B. Catron, C. W. Daniels, F. Fuetsch, F. E. Wagner, A. H. Nelson, F. S. Cirigliano and E. E. Canning. Standing: H. C. Harrison, George Cook, T. B. Thomas, R. D. Goff, L. J. Horovitz, J. C. Wright, A. J. Latham, Jim Campbell, Sandy Sandstrom, Bob Carey and G. E. Minahan, Jr.

Maritime Commission
Coast Yard Inspectors

Joinery Inspectors at Richmond Yard Two, Permanente Metals Corp: Thomas Henderson; E. Hotting, Senior Joinery Inspector; and William T. Sutherland.

Resident Plant Engineer, Harold E. Webb of Richmond Yard One of the Permanente Metals Corp. with his feminine assistants.



Machinery and Electrical and Hull Inspectors at Richmond Yard Two, Permanente Metals Corp.

FT HAND PHOTO ([illegible])
st row, left to right: Henry Hinrichs, E; Bill Hewitt, E; Lee Hieronimus, E; Malcolm Moores, E; C. W. Orr, Principal Electrical Inspector; W. G. veley, Senior Electrical Inspector, and Harold E. Jensen, E. Second row: Fab Burkhart, E; Walter H. Springer, M; John B. Wilson, M; James C. strosky, Principal Machinery Inspector; Edward J. Bauman, Senior Machinery Inspector; A. Boyd, Senior Machinery Inspector; Jack L. Welker, E, Floyd Donaldson, E. Third row: F. R. West, M; T. D. Palmer, M; H. N. Taylor, M; W. A. Banner, M; H. M. Kordoules, M; C. P. Armstrong, M; A. Lewis, M; R. H. Lines, M, and R. A. Cary, M.

GHT HAND PHOTO
st row: J. Paladini; D. Spencer; V. Sharp; Fred M. Hansen, J. Mitchell; Patrick Aloysius Fitzpatrick; Fred Edgington; William Simpson; Howard swell; D. S. Griffiths and C. R. Tafaro. Second row: Ralph Neely; E. Coccary; J. Barnett; Charles Stewart, Principal Hull Inspector; Alex F. rshall, Senior Hull Inspector; Leonard Mistretta; Earl K. Johnson and Robert J. Barr; Third row: James Henneberry; C. deFlores; B. Wasilchen; E. Moran; David E. Stewart; J. Melady; Jack McPartland, F. M. Butteryway; W. Daley; and W. Williams.

L. E. Erickson, manager Winch and Hoist Division of Six Wheels, Inc., Los Angeles, Calif.

WSA Changes in Washington

Washington advices at press time reported that **David E. Scoll**, assistant to WSA Administrator Emory S. Land, had resigned his Maritime Commission post to become affiliated with the Henry J. Kaiser interests on the Pacific Coast.

Mr. Scoll, well-known executive with the Maritime Commission, has been one of the most active leaders in the success of the Government's wartime merchant marine program.

Resignation of **Franz Schneider**, associate deputy administrator for the War Shipping Administration in Washington, D. C., has been reported. Captain **Granville Conway** had taken over Mr. Schneider's duties, as the latter intends to return to private business and will continue to serve WSA in an advisory capacity.

West Coast General Electric Appointment

Chris W. Griffin has been appointed manager of the newly established General Electric distributing branch in Los Angeles, according to H. L. Andrew, vice president in charge of the company's Appliance and Merchandise Department, Bridgeport, Conn. The new distributing branch opened its offices on the first of the year, at 212 North Vignes Street, Los Angeles.

Under Mr. Griffin's direction, the new distributor branch will serve dealers throughout the Los Angeles wholesale area, handling sales of G. E. refrigerators, ranges, home laundry equipment, water heaters, dishwashers, disposalls and kitchen cabinets, as they become available to the public.

Now General Agents for W.S.A.

Carl F. Fennema, vice president and general manager of the Wilmington Transportation Co., 175 W Water Street, Wilmington, California, announces that this company has now been appointed General Agents for the War Shipping Administration at Los Angeles Harbor.

The Wilmington Transportation Company conducts a general towage and lighterage service with its fleets of tugs and barges. Its San Francisco division office is located in the Shipyard Ferry Terminal Building on the Embarcadero, at the foot of Mission Street, and is agent for the U. S Maritime Commission.

Oceanic Marine Opens New Offices

Newcomers to San Francisco, the Oceanic Marine Industries Corporation, have announced the opening of new offices at 144-154 Second Street.

The firm is a national company engaged entirely in marine activities, including ship scaling, tank cleaning, chemical tank cleaning, painting, combustion insulation, insulation featuring "Ocean-Lite," and sand blasting. The company also maintains offices and plants in New York, Georgia, Maryland and Massachusetts.

Charles Sorrentinio, vice president of the firm, who is in charge of the new San Francisco office, was formerly in Brooklyn, New York and Savannah, Georgia. Several of his assistants, now all permanent San Francisco residents, were formerly associated with him in Brooklyn.

The new San Francisco offices and plant of Ocean Marine Industries Corporation at 144-154 Second St.

WHO'S WHO afloat and ashore

ERNEST E. JOHNSON

Ernest E. Johnson Prisoner of Nippon,

Welcome news was brought, with the return to this country of George J. McCarthy, an exchange prisoner of the Japs who was formerly passenger agent in the Orient for the American President Lines, that **Ernest E. Johnson** is a prisoner of the Nips in Manila. This was the first authentic news that Mr. Johnson is safe.

Ernest Johnson, former Pacific Coast shipping man, served with the Dollar interests in San Francisco many years. Before the war, he was, for five years, Oriental representative for the U. S. Maritime Commission.

His brother, Alfred E. Johnson, is assistant manager of the Australian Inbound Freight and South Seas department of General Steamship Corporation.

Loss of Empress of Canada

News of the loss of the palatial liner Empress of Canada, over a year ago, victim of an Italian submarine's torepdo, was made known on February 18, by the British Admiralty. The liner was lost off Freetown, West Africa, with 400 persons missing, most of whom were Italian prisoners of war.

Eight hundred persons were saved from $8,000,000 vessel which was taken over by the British Admiralty shortly after war was declared.

John D. Reilly, Jr. Ensign in Navy

John D. Reilly, Jr., son of the president of Todd Shipyards Corporation, is now an ensign in the Navy and is assigned to the Philadelphia Navy Yard as an inspector of shipping.

Ensign Reilly is well known in Puget Sound marine circles as he was employed in the engineering and drafting departments of the Seattle-Tacoma Shipbuilding Corporation before he entered the Navy.

He is a graduate of Yale and also took a post graduate course in Marine Engineering at the University of Washington, while he was employed at Sea-Tac.

"Heinie" Gelhaus Fixes Normandie

H. F. "Heinie" Gelhaus, assistant general manager of the Brooklyn division of the Todd Shipyards Corporation, is taking an active part in the reconditioning of the giant carrier, Lafayette, formerly the luxury liner Normandie.

"Heinie" is widely known in Pacific Coast marine circles and served as marine superintendent for Swayne & Hoyt; director of the Mariner's Club; and part owner of the "Log."

Changes

Harry Thompson, who was temporarily in charge of the Los Angeles office of W. R. Grace & Co., is back in the San Francisco general office of the Grace Line. **William St. Amant** is now in charge of the Los Angeles branch.

COMMANDER ALFRED G. FORD

Who supervised the building of the Alameda, Calif., Officers School and who has been Commanding Officer at that school since its opening, is now at the Officers School at New London, Connecticut, as Commanding Officer there.
The best wishes of the marine fraternity on the Pacific Coast go with Commander Ford.

E. B. SCOTT

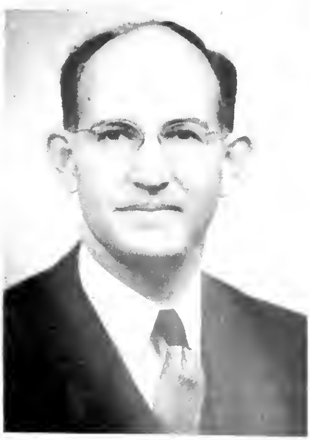
Enterprise Sales Head

The appointment of **E. B. Scott** to the position of Sales Manager of the Engine Division of the Enterprise Engine & Foundry Co., largest builders of diesel engines in the West, was announced recently by Vice President C. G. Cox. Prior to his promotion, Mr. Scott was manager of repair and maintenance division, and assistant to Mr. Cox.

Mr. Scott's experience includes eight years with Hall Scott Motors and three years with the Menasco Mfg. Co. of Los Angeles.

Announcement

Lee W. Ralston, former supervisor of trade and industrial teacher training for the California State Department of Education, has been named supervisor of industrial relations for the Manufacturing and Repair Department, Westinghouse Electric & Manufacturing Co. In his new post, Mr. Ralston will be responsible for company-employee relations at the headquarters at Emeryville and also the branches located at Los Angeles, Portland, Seattle and Salt Lake City.



LEE W. RALSTON

Captain Ross S. Culp Succumbs

A lingering heart ailment claimed the life of Captain Ross S. Culp, U. S. N., one of the best known and respected naval officials in the 12th Naval District, at Oak Knoll Hospital on February 17. He was 59 years of age.

A graduate of Annapolis in 1905, Captain Culp was personnel officer for the 12th Naval District. His career included commander of submarines in the Asiatic Fleet; head of the branch office of the U. S. Hydrographic Office in the Merchants Exchange Bldg., San Francisco; commander of the cruiser Raleigh and of the Honolulu submarine base.

A. E. KINCAID, JR.

A. E. Kincaid, Jr., Transferred

Owens-Corning Fiberglas Corporation has announced the transfer of **A. E. Kincaid, Jr.**, from the company's general office in Toledo, Ohio, to Washington, D. C., office. The transfer was effective the first of the year.

Mr. Kincaid has been manager of the Owens-Corning's shipbuilding division since June, 1942. During this time he visited nearly every shipyard in the country and intends to maintain his association with shipbuilders and marine contractors from his new post in Washington.

PAUL C. WILMORE

G. E. Man Goes to New Post

Paul C. Wilmore, General Electric Public Relations Manager for the West Coast, is being transferred to Cincinnati, Ohio, to head up the new G. E. household appliance distributing branch being established there, according to Mr. H. L. Andrews, vice president in charge of the Appliance and Merchandise Department, Bridgeport, Connecticut.

Mr. Wilmore, well known in public relations and advertising circles, has spent the past five years on the West Coast, the first three of which he was manager of General Electric refrigerator sales in the Western Region, later becoming Public Relations Manager for the company, with headquarters in San Francisco.

Mr. F. Lowell Garrison, former sales manager, General Electric Supply Corporation, Butte, Montana, will take over Mr. Wilmore's former post, and continue General Electric contacts with newspaper and magazine media on the Pacific Coast. He will be located in the Russ Building, San Francisco.

Incorporation Papers Filed

In January, incorporation papers were filed for formation of a new steamship company, The American Trading and Shipping Company of San Francisco.

John Raymond, president of the American Trading Company, heads the new concern and **Jack Hook**, formerly McCormick Steamship Company's Los Angeles district manager, is the new general manager. Application has been made for a general agency.

Marine Progress In 1943

(Continued from page 112)

sidered an entrance examination, does not make him a skilled welder. The tremendous problems being faced by our shipyards today in the training of welders and the difficulties of retaining their services after they are trained are fully appreciated. Our surveyors report that the turnover rate for welders in shipyards is still very high, and that many young men who started welding at the beginning of the shipbuilding program are being drafted just when the yards are beginning to get some real benefit from their experience.

Studies in Welded Ships

The whole question of the design and construction of welded ships is at present under investigation by a committee appointed last spring by the Secretary of the Navy, on which this Bureau is represented, together with the Maritime Commission, Navy Department and Coast Guard. Our Technical Staff is cooperating with this committee and its sub-committees in the collection and analysis of all casualties; also in various research projects which have been initiated by the War Metallurgy Committee, which are of the highest importance, and which it is hoped will throw considerable light on our problems. This Bureau also keeps in close touch with the activities of the Welding Research Council and the American Welding Society through its representation on all important committees. As far as material is concerned, it should be said that the steel manufacturers are delivering steel to the shipyards which is up to specification requirements, which our experience has shown to be quite satisfactory for riveted ships. The practical possibilities of obtaining a steel more suitable for welded construction is, however, being explored, and considerable research work is being carried out by some of our steel manufacturers and others. Our own metallurgical staff has done some good work along these lines with the limited laboratory facilities we have now available.

A Brighter Side

There is another and brighter side to the picture, as it is an undoubted fact that but for the use of welding the unprecedented production of ships which has so greatly furthere[d] the war effort would have been abso[-]lutely impossible. It is also true tha[t] despite the major failures which hav[e] occurred in some of our welded ship[s] we have been spared the rivetin[g] troubles such as were experience[d] with the Emergency Fleet ships of th[e] last war, and which necessitated fre[-]quent drydockings for the renewal o[f] defective rivets. Cases have also oc[-]curred where welded ships have bee[n] drydocked for collision and bottor[n] damage which were undocked with[-]out carrying out any damage repair[s] which seldom happens in the case o[f] a riveted ship. Some of our welde[d] ships have withstood severe enem[y] action damage and safely reache[d] port under circumstances which coul[d] conceivably have resulted in a tota[l] loss if the ship had been of rivete[d] construction. Practical experience [is] also being gained in the constructio[n] of welded ships which under norma[l] conditions would have taken years t[o] acquire, and the accumulated info[r-]mation, together with the results o[f] various research projects now unde[r] way, will undoubtedly be entirel[y] beneficial to welded ship constructio[n] in the post-war period.

Pacific MARINE REVIEW

Published monthly with alternate listings of yards in two sections; Pacific Coast, one month; Atlantic, Lakes and Rivers, the following. Send Information to Directory Editor, 500 Sansome Street, San Francisco.

American Shipyards

DIRECTORY of EXECUTIVES

Pacific Coast

ACKERMAN BOAT COMPANY
2414 Rhine Avenue
Newport Beach, Calif.
President: G. Fuller Peters.
Vice President: C. E. Ackerman.
Naval Arch.: L. E. Geary.
Chief Engineer: Fred B. Hunie.
Purch. Agent: H. R. Ring.

AETNA CONSTRUCTION COMPANY
631 S. Witmer
Los Angeles, California

ALBINA ENG. & MACHINE WORKS, Inc.
2103 N. Clark Ave.
Portland 12, Oregon
President: George Rodgers.
Vice President and Manager: L. R. Hussa.
Treasurer: T. J. Cousins.
Naval Architect: C. F. Butler.
Purchasing Agent: J. D. Annand.
Chief Engineer: Ralph O'Rourke

AMERICAN PIPE & CONSTRUCTION
Lido Canal
Newport Beach, Calif.
Superintendent: H. C. Clark.

AMERICAN TUG BOAT CO
City Dock
Everett, Washington

ANACORTES SHIPWAYS, INC.
Box 111
Anacortes, Washington
President: L. P. Clark.
Vice Pres.: W. P. Yaw & D. M. Drake.
Secretary: E. E. Carroll.
Naval Architect: H. C. Hanson.
General Supt.: Charles Taylor.
Purchasing Agent Harrison Newkirk.

ANDERSON & CHRISTOFANI
Innes & Griffiths Sts.
San Francisco, Calif.

ASSOCIATED SHIPBUILDERS
Plant No. 1, Harbor Island Plant
2727-16th Ave. S. W.
Seattle, Wash.
General Manager: G. H. Stebbins.
Gen. Supt.: C. M. Rohda.
Chief Engineer: C. W. Johnson.
Procurement Manager: R. K. Jaggar.
Purchasing Agent: E. B. Devener.

Plant No. 2, Lake Union Plant
1515 Fairview No.
Seattle, Wash.
General Manager: G. H. Stebbins.
Asst. General Manager: H. W. Blaney.
Naval Architect: B. R. Richards.
Purchasing Agent: A. T. Harris.

ASTORIA MARINE CONSTRUCTION CO.
Astoria, Ore.
President: Joseph M. Dyer.
Vice President and Manager: G. T. McClean.
Treasurer: Geo. C. Sheahan.
Naval Architect: Joseph M. Dyer.
Chief Engineer: W. H. Dole.
Purchasing Agent: Richard Schroeder.

ATLANTIC BOAT WORKS
11374 Atlantic Ave.
Lynwood, Calif.

BALLARD MARINE RAILWAY CO.
5351-24th, N. W.
Seattle, Washington
President: W. G. Fryberg.
Vice President: E. C. Smith
Manager: H. F. Fryberg.

BARBEE MARINE YARDS, INC.
Foot of 26th Ave. N. W.
Seattle, Washington
Plant No. 2
Bryn Mawr, Wash.
President: E. P. Donnelly.
Vice President: D. F. Mitchell.
Manager: E. P. Donnelly.
Naval Architect: Edwin Monk.
Purchasing Agent: P. L. Douglas.

BARR LUMBER COMPANY
1022 East Fourth St.
Santa Ana, California
Co-Partners: O. H. Barr and Wilber Barr.
Manager: H. G. Larrick.

BASALT ROCK CO., INC.
8th & River Sts.
Napa, California
President & Mgr.: A. G. Streblow.
Vice Pres.: Walter Fawcett.
Asst. Mgr.: E. F. Brovelli.
Naval Architect: Don McCall.
Chief Engineer: Ed Godsil.
Purchasing Agent: J. E. Godley.

BELAIR SHIPYARD DIVISION
Barrett & Hilp
P. O. Box 675
South San Francisco, California
Owners: Frank Barrett & Harry Hilp.
Owners' Rep.: J. F. Barrett.
Yard Manager: Wm. R. Lawson.
Naval Architects: Joslyn & Ryan.
Engineers of Concrete Design: Ellison & King.
Chief Engineer: Fred Crocker.
Purchasing Agent: Thomas Telfer.

BELL LUMBER CO.
3491 E. Gage Ave.
Bell, Calif.

BEAVER BOAT WORKS
Portland, Oregon

BELLINGHAM IRON WORKS, INC.
Marine Division, Squalicum Waterway
Bellingham, Wash.
(formerly: Bellingham M. R. & B. B. Co.)
Vice Pres.: & Owner: A. W. Talbot.
Sec. & Treas.: C. Ivan Jamieson.
General Manager: R. S. Talbot, Jr.
Naval Architect: Walter Howell.
General Supt.: Iver Nelson.
Chief Engineer: Ed Lonke.
Purch. Agent: Hilton Talbot.

BERKELEY STEEL CONSTRUCTION CO.
1331 East Shore Highway
Berkeley 2, California
President: T. S. Neilson.
Vice President: D. S. Neilson.

PACIFIC COAST MARINE GOVERNMENT DIRECTORY

MARITIME COMMISSION

Regional Director of Construction
Carl W. Flesher
Financial Bldg.
Oakland, Calif.
Phone: TEmplebar 7638

Coordinator of Ship Repair and Conversion
J. H. Lofland
L. C. Lundquist, Asst.
Stock Exchange Bldg.
San Francisco, Calif.
Phone: YUkon 0960

WAR PRODUCTION BOARD

Salvage Division

San Francisco—
Col. F. M. Smith
1355 Market Street
Phone: KLondike 2-2300

ETHLEHEM STEEL COMPANY, INC.
Shipbuilding Division—San Francisco Yard
20th & Illinois Sts.
ieneral Manager: A. S. Gunn.
ssistant General Manager: W. M. Laughton.
ales Manager: J. T. Greany.
ssistant Purch. Agt.: E. W. Thomas.
Alameda Yard
lanager: Fred McLean.
San Pedro Yard
lanager: Thomas Forster.
sst. to Manager: William A. Harrington.

IRCHFIELD BOILER CO., INC.
2503 East 11th St.
Tacoma, Washington
resident and Manager: A. Davies.
ice President: James Davies.
laval Architect: Silas E. Nelsen.
hief Engineer: Ralph Kenton.
abrication Supt.: Paul Dahl.
lull Supt.: Jack Pennington.

I. J. BLANCHARD BOAT CO.
3201 Fairview Ave.
Seattle, Washington
President and Manager: N. J. Blanchard.
ice President: C. P. Blanchard.
urchasing Agent: J. L. Patton.

IOESPFLUG CONSOLIDATED CO.
Anacortes, Washington
lanager: Richard B. Miles.

IOWES & ANDREWS
153 Steuart Street
San Francisco, Calif.
Officers: F. R. Bowes and N. Andrews.
ard Officials: F. R. Bowes and N. Andrews.

IRYANT'S MARINE
117 E. Northlake
Seattle, Washington
President: Jerry Bryant.

CALIFORNIA SHIPBUILDING CORP.
P. O. Box 966.
Wilmington, California
Chairman of the Board: S. D. Bechtel.
President: J. A. McCone.
Vice President and General Manager: J. K. Doolan.
Asst. Gen. Mgr.: Albert O. Pegg.
Adm. Mgr.: J. M. Warfield.
Works Manager: J. S. Sides.
Chief Engineer: W. C. Ryan.
Marine Engineer: Dave Charles.
Purchasing Agent: H. A. Keeler.
Hull Supt.: Carl Rettig, Jr.

CALIFORNIA STEEL PRODUCTS COMPANY—MARINE DIVISION
Foot of 16th Ave.
Oakland, California
Marine Superintendent: E. J. Shaw.

CAMPBELL MACHINE CO.
Foot of 8th St.
San Diego, Calif.
Partners: David C. and George E. Campbell.
Chief Naval Architect: E. G. Bertin.
Plant Superintendent: David C. Campbell.
Purchasing Agent: O. C. Edson.
Hull Superintendent: M. Madruga.

CHAS. S. CARLSON SHIPYARD
La Conner, Wash.

CARMAC SHIPYARDS, INC.
Foot of 28th Ave., N. W.
Seattle, Washington

CHILMAN SHIPYARD
Hoquiam, Washington
President and Owner: Ivar Chilman.

COLBERG BOAT WORKS
Stockton and W. Lindsey Streets
Stockton, California

COLUMBIA RIVER PACKERS ASSN., INC.—SHIPYARD DIVISION
Astoria, Oregon
President: E. W. Thompson.
Vice President: T. F. Sandoz.
Manager: W. B. Wootton.
Naval Architect: J. E. Wicks.
Chief Engineer: A. Lindstrom.
Purchasing Agent: R. C. Larson.

COLUMBIA SHIPBUILDING CO.
Portland, Oregon
Plant: Columbia City, Oregon

COMMERCIAL IRON WORKS
Foot of S. W. Gibbs St.
Portland, Oregon
Pres. and Treas.: Winston W. Casey.
Executive Vice President and Gen. Manager: Henry A. White.
Vice President: Edward L. Casey.
Naval Architect: Willis G. Telfer.
Chief Engineer: Ray Purdy.
Purchasing Agent: Ivan Horne.

CONCRETE SHIP CONSTRUCTORS
National City, California
Managing Partners: Carlos Tavares and R. S. Seabrook.
Naval Architect: D. M. Callis.
Structural Engineer: R. H. Annin.
Superintendent: J. Meents.
Purchasing Agent: C. L. Wurster.

CONSOLIDATED STEEL CORP., LTD.
5700 South Eastern Avenue
Los Angeles, California
(P. O. Box 6880, East Los Angeles Branch, Los Angeles 22, California)
Wilmington, Calif., Shipbuilding Div.
Long Beach, Calif., Shipbuilding Div.
President: Alden G. Roach.
Vice President in Charge of Production: Lloyd R. Earl.
Vice President in Charge of Finance: F. J. Knoeppel.
Treasurer: Edward H. LeBreton.
Secretary: John M. Robinson, Jr.
Naval Architect (Wilmington): D. G Warren.
Purchasing Agent: H. W. Abramson.
Manager of Personnel: C. W. Giegerich.

COTTON ENGINEERING & SHIPBUILDING CO.
Port Townsend, Washington
President: Harry A. Cotton.
V. P. and Manager: George J. Cotton.
Naval Architect: Harold Lee, Associates.
Chief Engineer: A. W. Mickelson.
Purch. Agent: Harry A. Cotton.

CRAIG SHIPBUILDING CO.
Long Beach 2, California
Chairman of the Board: John F. Craig.
President: James G. Craig.
Vice President: John Craig II.
Sales Engineer: Albert Myers.
Purchasing Agent: F. W. Philpot.

CRUIKSHANK ENGINEERING CO.
Seattle, Washington
President and Purchasing Agent: Arthur A. Krueger.
Vice President: Otto A. Ranft.
Naval Architects: H. C. Hanson and W. C. Nickum & Sons.
Chief Engr.: Major Barton Cruikshank

DUWAMISH SHIPYARD, INC.
5658 W. Marginal Way
Seattle 6, Washington
President: F. Flakstad.
Vice President & Business Manager: A. J. Larsen.
Manager & Purchasing Agent: Axel Larsen.

EAST BAY SHIPBUILDING & REPAIR COMPANY
Oakland, Calif.
President: W. H. Stevens.
General Manager: Jay Graves.

J. O. ELROD & ASSOCIATES
Portland, Oregon

EDMONDS BOATHOUSE
Box 401, Midway, Wash.
Owner: H. H. Jacobsen.
Manager: Andy Edwards.

EUREKA SHIPBUILDERS, INC.
Box 1014
Eureka, California
President & Manager: La Mone Call.
Mgr.: S. C. Ramage.
Chief Eng.: J. W. Reynolds.
Purch. Agt.: Ward H. Johns.

EVERETT MARINE WAYS, INC.
Bayside and Hewitt
Everett, Washington
President: E. J. Templeton.
Vice Pres. & Sec.-Treas.: E. W. Stuchell.
Asst. Sec.-Treasurer, Mgr., Purchasing Agent: E. L. Bishop.
Naval Architect: H. C. Hanson.

EVERETT PACIFIC CO.
Tract "O"
Everett, Washington
President: William Pigott.
Vice President: Paul Pigott.
Manager: B. C. Knerr.
Naval Architect and Chief Engineer: Alexander M. Brown.
Purchasing Agent: J. W. Phillips.

FELLOWS & STEWART, INC.
P. O. Box 157
Wilmington, California
President and Manager: Victor B Stewart.
Vice President: Homer H. Evans.
Sec.-Treas. and Naval Architect: Jos. Fellows, Jr.
Chief Engineer: J. J. Bommhardt.
Purchasing Agent: O. J. Michael.

FREDRICKSON MARINE ENG. REPAIR
244B San Pablo Ave.
Berkeley, Calif.

FREMONT BOAT WORKS
Seattle, Washington

F. L. FULTON SHIPYARD
Antioch, California
President: F. L. Fulton.
Purchasing Agent: Charles Giavannoni

GARBUTT-WALSH, INC.
Terminal Island, California
Pres.: Matt J. Walsh.
Vice President: David J. Walsh.

GEN. ENGINEERING & DRY DOCK CO.
Foot of Schiller St.
Alameda, California
President: Geo. A. Armes.
Vice Pres. and Gen. Mgr.: James H. Young.
Sec.-Treas.: P. P. Mesquita.
Plant Manager: H. C. Hanson.
Naval Architect: Robert Y. Shaw.
Chief Engineer: F. H. Fox.
Purchasing Agent: Albert P. Wanner.

GIG HARBOR SHIP CO.
Gig Harbor, Washington
Owner: Geo. A. Cruse.

GRANDY BOAT CO.
Seattle, Washington

GRAYS HARBOR SHIPBUILDING CO.
Aberdeen, Wash.
President: Alert Schafer.
Vice President: Ed Lundgren.
Manager: Roy K. Purkey.
Purchasing Agent: C. G. Wagner.

GUNDERSON BROTHERS ENGINEERING CORP.
4700 N. W. Front
Portland, Oregon
Pres. & Vice Pres.: C. E. Gunderson.
Naval Arch. & Chief Eng.: L. S. Baier.
Purch. Agent: E. M. Lundquist.

H. R. L. MACHINE WORKS, INC.
3301-1st, South
Seattle 4, Washington
President: J. A. Lagoe.
Vice President: W. J. Hendricks.
Secretary: E. A. Hendricks.
Chief Engineer: Carl Winquist.
Purchasing Agent: Donald H. Barbour.
Marine Supt.: T. H. McLean.

A. E. HANSEN
223 First Street
Newport Beach, Calif.

HANSEN BOAT YARD
Everett, Wash.

HARBOR BOAT BUILDING CO.
Berth 264, Fish Harbor
Terminal Island, California
President: John Rados.
Vice President: Myles Rados.
Secretary-Treasurer: J. D. Hamilton.
Plant Superintendent: Myles Rados.
Purchasing Agent: Al. W. Rados.

JOSHUA HENDY IRON WORKS
Sunnyvale, California

HICKINBOTHAM BROS.
Construction Division
Stockton, California
J. C. Hickinbotham (partner).
R. W. Hickinbotham (partner).
Manager: R. M. Guntert (partner).
Naval Architect: C. W. Gulick
Chief Engineer: L. R. Zimmerman (partner).
Purchasing Agent: C. F. Stribley.

HILSTROM SHIPBUILDING COMPANY
Marshfield, Oregon

HINESLY JESS BOAT CO.
1215 Coast Hiway
Newport Beach, Calif.

HODGSON-GREENE-HALDEMAN SHIPBUILDERS
1409 W. 7th St.
Long Beach, Calif.
Partner & Gen. Mgr.: Burch E. Greene.
Partner & Gen. Supt.: Frank W. Hodgson.

A. B. HOWE & ASSOCIATES
Tacoma, Washington

HUBBARD'S SOUTH COAST COMPANY
23rd and Central
Newport Beach, California
President: Walton Hubbard, Jr.
1st Vice President: Dr. Walton Hubbard.
2nd Vice President: Walter G. Franz.
Manager: Hubbard C. Howe.
Chief Engineer: Charles Blakely, Jr.
Purchasing Agent: Walter G. Franz

HURLEY MARINE WORKS, INC.
Foot of Fifth Ave.
Oakland, California
President: J. J. Hurley, Jr.
Vice President: H. A. Magnuson.
Manager: James Greig.
Chief Draftsman: Wayne Heinbockel.
Chief Engineer: H. R. Norrick.
Purchasing Agent: Carl W. Leppla.

JENNINGS STAFF, MARINA
West End Sellwood Bridge
Portland, Oregon
Owner: Stafford H. Jennings.
General Manager: R. R. Atchison.

JENSEN MOTOR BOAT CORP.
1417 E. North Lake
Seattle, Washington
Owners: Tony and Anchor Jensen.

C. D. JOHNSON LUMBER CORP.
Portland, Oregon

JUDSON-PACIFIC WAR INDUSTRIES
Emeryville, Calif.

KAISER COMPANY, INC.
RICHMOND SHIPYARD No. 3
Richmond, California
President: Henry J. Kaiser
Vice Presidents: Edgar F. Kaiser, A. B. Ordway, Clay Bedford, E. E. Trefethen, Jr., and Chad Calhoun.
Secretary: George Havas.
Treasurer: G. G. Sherwood.
General Manager: Clay P. Bedford.
Executive Asst. Mgr.: E. T. Larsen.
Executive Asst.: J. L. Friedman.
Naval Architect: Neil A. Clarke.
Chief Engineer: Harry Bernat.
Purchasing Agent: Frank Nelson.

KAISER CARGO, INC.
RICHMOND SHIPYARD No. 4
Richmond, California
General Manager: Clay P. Bedford.
Executive Asst. Mgr.: J. E. Orchard.
Chief Engineer: Louis Bosa.
Purchasing Agent: Frank Nelson.
Naval Architect: Ben Seaborn.

KAISER CO., INC.
Swan Island Yard
P. O. Box 4259
Portland, Oregon
Vice Pres. and Gen. Mgr.: Edgar F. Kaiser.

Secretary: J. F. Reis.
Assistant General Manager: A. R. Nieman.
Naval Architect: R. A. Smith.
Yard Superintendent: E. L. Hann.
Chief Design Eng.: Alex Stoyanov.
Office Mgr.: George E. Clinton.
Purchasing Agent: Clayton Sharp.

KAISER CO., INC.
Vancouver, Washington
Vice Pres. and General Manager: Edgar F. Kaiser.
Secretary: J. F. Reis.
Assistant General Manager: Mike Miller.
Asst. Gen. Supt.: John Tacke.
Yard Superintendent: John Hallett.
Office Mgr.: Rex C. Hamby.
Purchasing Agent: Fred Lord.
Hull Supt.: Ed Argersinger.

KING SHIPBUILDING CO.
Newport Beach, California

KLEPP MARINE WAYS
Rainier, Oregon
General Manager: Erik O. Klepp.
Asst. Purch. Agent: Alfred S. May.

KIRKLAND MARINE CONSTRUCTION
P. O. Box 668
Kirkland, Washington
Partner: Carl M. Ballard.
Partner: Phil F. Tomas.
Manager: Phil F. Tomas.
Naval Architect: Edwin Monk.
Purchasing Agent: D. Wright.

GEORGE W. KNEASS COMPANY
18th and Illinois Streets
San Francisco, California
President: Webster L. Kneass.
Naval Architect: D. R. Lyon.
Purch. Agent: W. H. Pierce.

KRUSE & BANKS SHIPBUILDING CO., INC.,
North Bend, Oregon
President and Manager: Robert Banks.
Vice Pres. & Naval Architect: Fred A. Kruse.
Purchasing Agent: H. G. Huntley.

KYLE & CO.
Yards at Fresno and Stockton, California
President: Chas. G. Connors.
Vice Pres.: W. B. Kyle.
Secretary: Willis Kyle.
Manager: Chas. G. Connors.
Naval Architect: Paul H. Macniel.
Purchasing Agent: Frank Hanway.

LAKE UNION DRY DOCK & MACHINE WORKS
1515 Fairview Ave.
Seattle, Washington
President: H. B. Jones.
Vice President & Secy.: W. L. Grill.
General Manager: A. F. Marion.
Plant Superintendent: Harry Rogers.
Purchasing Agent: L. B. Johnson.

LAKE WASHINGTON SHIPYARDS
Houghton, Washington
President: C. A. Burchardt.
Vice Pres. & Gen. Mgr.: P. F. [illegible].
Yard Superintendent: E. H. Rich
Naval Architect: George [illegible]
Chief Engineer: A. C. Nation.
Purchasing Agent: A. R. Van [illegible]

AL LARSON BOAT SHOP, INC.
Terminal Island, California
President and Manager: Al Larson.

Vice President: J. M. Larson.
Naval Architect and Chief Engineer: Adolph W. Larson.

LIND BROS. BOAT MART
Squalicum Fill
Bellingham, Washington

LONG BEACH BOAT SHOP
1761 Water Street
Long Beach, Calif.
President: John Harvey.
Superintendent: C. H. McAlary.

H. A. LONG BOAT WORKS
West 4th Ave.
Olympia, Washington

LOS ANGELES S. B. & D. D. CORP.
San Pedro, California
President: Alfred F. Smith.
General Supt.: Edwin W. Hanney.
Secretary-Treasurer: J. B. Ingoldsby.
Direc. Eng'n & Des.: H. O. Shuster.
Naval Architect: Douglas B. McFarland.
Navy Purch. Agent: M. L. Rhodes.
Commercial Purch. Agent: T. W. McDonald.

LOWMAN BOAT WORKS
485 Newport Blvd.
Costa Mesa
Newport Beach, Calif.

LYNCH SHIPBUILDING COMPANY
Foot of 28th St.
San Diego, California
President and Gen. Mgr.: Frank C. Lynch.
Plant Supt. and Manager: Paul Blackwell.
Office Manager: Harold F. Cary.
Purchasing Agent: Robt. J. Hubon.

MADDEN & LEWIS COMPANY
Ft. Turney St.
Sausalito, California
General Superintendent: J. H. Madden.
Plant Manager: A. E. Lewis.
Office Manager: K. B. Basford.
Purchasing Agent: A. J. Marion.

MARINE VIEW BOAT BUILDING CO.
R.F.D. 6, Box 141A
Tacoma, Washington
Owner: Peter Petersen.

MARINSHIP CORPORATION
Sausalito, California
President: K. K. Bechtel.
Vice President: S. D. Bechtel.
Vice President: J. A. McCone.
General Manager: W. E. Waste.
Administrative Manager: Robert Digges.
Asst. to Gen. Mgr.: Bruce Vernon.
Prod. Mgr.: Ray Hamilton.
Chief Engineer: Harold Bolton.
Personnel Asst. to Gen. Mgr.: E. B. Fox.
Materials Manager: E. J. Rising.
Naval Architect: T. F. FitzGerald.
Manager of Purchasing & Expediting: E. F. Miller.

MARITIME SHIPYARDS
27th W. & Commodore Way
Seattle, Washington
Owner: Finn Lepsoe.

J. M. MARTINAC SHIPBUILDING CORPORATION
1501 Railroad Ave.
Tacoma, Washington
President: Joseph Mijich.

Vice President: Fred Borovich.
Gen. Mgr. & Naval Architect: J. M. Martinac.
Business Manager and Purch. Agent: Fred C. Hansen.

MARTINOLICH SHIPBUILDING CO.
Pier 52
San Francisco 7, California
Partner: Anthony C. Martinolich.
Partner: Robert Martinolich.
Partner: John Carovano.
Partner & Naval Architect: John A. Martinolich.
Superintendent: Ralph E. Steel.
Purchasing Agents: S. S. Ratto and H. W. Campbell.

MARTINSON SHIPYARDS INC.
Seattle, Washington

MATSON NAVIGATION CO.
San Francisco, California
Manager: G. K. Nichols.
Chief Engineer: E. Narr.
Purchasing Agent: M. H. La Rue.

MODERN BARGE & SHIPBUILDING CO.
Long Beach, California

MOJEAN & ERICSON
2128 East D Street
Tacoma, Washington

MONTAGUE PIPE & STEEL CO.
San Francisco, California
President: O. H. Fisher.
Vice President: W. J. Glover.
Manager & Naval Architect: R. E. Fisher.
Purchasing Agent: H. Rider.

MONTEREY BAY INDUSTRIES, INC.
Address all mail to:
593 Market Street
San Francisco 5, California

MOORE DRY DOCK CO.
Ft. of Adeline St.
Oakland, California
Chairman of the Board: Jos. A. Moore.
President & Gen. Mgr.: Joseph A. Moore, Jr.
Vice President: James R. Moore.
Vice President and Secretary: N. Levy.
Vice Pres. & Treas.: A. R. Viner.
Mgr. of Repairs: William Harrower.
Supt. of Const.: S. A. Knapp.
Hull Superintendent: H. W. Fawke.
Naval Architect: R. J. Hischier.
Chief Engineer: J. B. Matthews.
Purchasing Agent: A. L. Wille.

MOYNIHAN & CO., LTD.
San Francisco, California

NATIONAL SHIPYARDS, INC.
Anacortes, Washington

NELSON BOILER AND TANK CO., INC.
1001 East D Street
Tacoma, Wash.
President & Mgr.: E. W. Lutz.
Vice President: H. B. Lutz.
Purchasing Agent: C. A. Nelson.
Naval Architect: Chas. York.

NORTH AMERICAN SHIPBUILDING CORPORATION
(Formerly A. M. Rambo Company)
717 Coast Highway 101
Newport Beach, Calif.
President: Geo. H. Stricker.
Vice Pres.: W. C. Prewitt.
Manager: A. M. Rambo.
Naval Architect: Wm. F. Vonderahe.
Purchasing Agent: Albert S. Paine.

NORTHWESTERN SHIPBUILDING CO.
Foot of Harris Street
South Bellingham, Wash.
Pres. & Gen. Mgr.: J. N. Gilbert.
Vice Pres.: I. W. Kelly.
Asst. Mgr.: Wm. S. Coon.
Naval Architect: H. C. Hanson.
Production Mgr.: H. F. Isler.
Chief Engineer: J. J. Hubbell.
Purchasing Agent: C. H. Gilstrap.

OAKLAND SHIPBUILDING CORP.
1702 Bridgeway Blvd.
Sausalito, Calif.
President: Robert E. Rich.
Superintendent: Devere F. Baker.
Chief Engineer: Ernest Collins
Purchasing Agent: J. T. Butts.

OLSON & WINGE MARINE WORKS
4125 Burns Ave., N. W.
Seattle, Wash.
Owners: Oscar E. Olson and Carl B. Winge.
Office Manager: Edward Winge.
Assistant Production Manager: David Eldon Erickson.
Plant Superintendent: Ted Vadset.
Purchasing Agent: Wm. Richardson.

OLYMPIC SHIPBUILDERS
71 Columbia St.
Seattle, Washington
Plant: Port Angeles
Secretary: L. K. Smith.
Treasurer: Miller Freeman, Jr.

OREGON COAST MANUFACTURING CO.
Florence, Oregon

OREGON SHIPBUILDING CORP.
St. Johns Station
Portland 3, Oregon
Vice President and General Manager: E. F. Kaiser.
Secretary: J. F. Reis.
Assistant Gen. Manager: Albert Bauer.
Yard Supt.: Russell Hoffman.
Outfitting Supt.: F. A. Abraham.
Erection Supt.: George C. Wright.
Chief Purchasing Agent: F. D. McClintock.
Asst. General Supt.: John Tacke.
Office Mgr.: Allison MacGregor.

OSWEGO SHIPBUILDING CO.
Oswego, Oregon

PACIFIC BOAT BUILDING CO.
223 East F St.
Tacoma, Washington
Purchasing Agent: J. W. Henderson.

PACIFIC BOAT COMPANY
Terminal Island, Calif.
Purchasing Agent: H. E. Forster.

PACIFIC BRIDGE CO.
Shipbuilding Division
P. O. Box "B"
Alameda, Calif.
General Manager: Frank J. Dowling.
Asst. to Gen. Mgr.: Arthur F. Daily.
Gen. Construction Supt.: George F. Mitchel.
Project Engr.: Richard S. Holmgren.
Purchasing Agent: Edward Sullivan.
Comptroller: R. O. Johnson.
Personnel Manager: Al Feldhammer.
Director Employee Relations: Nate Shanedling.
Outfitting Supt.: Fred Northern.

PACIFIC CAR & FOUNDRY COMPANY
4th & Factory Streets
Renton, Washington
President: Paul Pigott.
Vice Pres. & Gen. Mgr.: H. N. Curd.
Vice Pres.: F. Schmitz.
Chief Engineer: A. Thomson.
Purchasing Agent: H. E. Ridalls.

PACIFIC COAST ENGINEERING CO.
Oak & Clement Sts.
Alameda, Calif.

PACIFIC COAST SHIPBUILDING CO.
Port Chicago, Calif.
President: D. C. Seagrave.
Vice President: W. F. Williamson.
Manager: D. C. Seagrave.
Naval Arch. and Chief Eng.: Gordon Ennes.

PACIFIC DRY DOCK & REPAIR CO.
Foot of 14th Ave.
Oakland, Calif.
President: Thomas Crowley.
Vice President: Thomas B. Crowley.
Manager: Oliver Mahin.
Chief Engineer: Al Rogers.
Purchasing Agent: George J. Williams.

THE PERMANENTE METALS CORP.
RICHMOND SHIPYARDS Nos. 1 and 2
Richmond, California
President: Henry J. Kaiser.
Vice Presidents: E. E. Trefethen, Jr., Edgar F. Kaiser, C. P. Bedford, and A. B. Ordway.
General Manager: Clay P. Bedford.
Asst. Gen. Mgr.: T. A. Bedford, Jr.
Naval Architect: Carl Olson.
Chief Engineer: Stan Kimball.
Purchasing Agent: Frank Nelson.

PETERSON BOAT BUILDING CO.
223 East F Street
Tacoma, Washington
Owner: Geo. Peterson.

THE PEYTON COMPANY
901 Coast Highway
Newport Beach, Calif.
Manager: C. R. Peyton.
Naval Architect: R. P. Peyton.
Purchasing Agent: M. C. Dodd.

POINTER-WILLAMETTE CO.
Edmonds, Washington
Owner: R. W. Pointer.
Engineer: George Dyke.

POLLOCK-STOCKTON SHIPBUILDING CO.
Stockton, Calif.

PORTLAND SHIPBUILDING CO.
Portland, Ore.
President and Mgr.: Albert K. Nelson.

PUGET SOUND BOAT BUILDING CORP.
820 East D Street
Tacoma, Wash.
Pres. & Purch. Agt.: Wm. L. Healy.
Vice Pres., Supt. Hull Outfitting: C. R. Martinolich.
Asst. Vice Pres.: J. B. Breskovich.
Secretary and Supt. Machine Shop: J. J. Petrich.
Treasurer: John D. Martinolich.

PUGET SOUND BRIDGE & DREDGING CO.
2626 16th Avenue S. W.
Seattle, Wash.
President: H. W. McCurdy.
Vice Pres. and Sec.: Raymond J. Huff.
Ship Repair Division
In Charge: H. W. Blaney.
General Foreman: Gino Fabbri.
Purchasing Agent: William Sells.

PUGET SOUND SHIPBUILDING CO. OF OLYMPIA
Mailing address: Box 429
Office and Yard: North Port Fill
Olympia, Washington
President: Edward Thompson.
Secretary: Fred H. Furey.
Manager: R. L. Prewett.
Constr. Supt.: M. Adams.
Purchasing Agent: J. Dean Newell.

REINELL BOAT WORKS
Marysville, Washington

RELIABLE WELDING WORKS
1218 West Bay Drive
Olympia, Wash.
President: A. W. Lewis.
Vice President: A. R. Lewis.
Asst. Vice President: H. R. Lewis.
Secretary: E. H. Lewis.
Asst. Purch. Agent: J. A. Laspa.
Naval Architect: H. C. Hanson.
Production Manager: Geo. Risse.

SAGSTAD SHIPYARDS
Foot of 20th Ave., N. W.
Seattle, Washington
Owner: S. E. Sagstad.
Construction Supt.: Donald Olts.
Construction Supt. at La Conner, Wash. Plant: Alf. Hansen.
Naval Architect: H. C. Hanson.
Chief Engineer: H. A. Thompson.
Purchasing Agent: Arthur Hanson.

SAN DIEGO MARINE CONST. CO.
Foot of Sampson St.
San Diego, Calif.
President: O. J. Hall.
Vice President: Ralph J. Chandler.
Manager: James N. Johnson.
Naval Architect: Dean B. Johnson.
Purchasing Agent: Harry Plumberg.

SAN PEDRO BOAT & YACHT CO.
Berth 44, Outer Harbor
San Pedro, California
President: David R. Faries.
Vice President: Robert E. Klinkner.
Manager: Robert E. Klinkner.
Chief Engineer: John M. Harper, Jr.
Purchasing Agent: W. D. Barnett.

SAVAGE BOAT WORKS
5955 S. Western
Los Angeles 44, California
Partner: Robt. W. Savage.
Partner: J. Homer Hough.

SEA-BELL SHIPBUILDING CO.
5400 W. Marginal Way
Seattle, Wash.
President: J. Razore.
Vice President: A. M. Morelli.
Asst. General Manager and Technical Adviser: A. W. Copp.
Naval Architect: W. C. Nickum.
Chief Engineer: H. D. Lohse.
Purchasing Agent: G. H. Elliott.

SEATTLE S. B. & D. D. CO.
2629 West 54th
Seattle, Wash.
President: Fred Bianco.
Vice President: Robert Scobie.
Manager and Sec. Treas.: R. B. Bivins.

Naval Architect: W. C. Nickum & Sons.
Chief Engineer: Fred Foerster.
General Superintendent: Wm. Larsen.
Purchasing Agent: A. R. Pickering.

SEATTLE-TACOMA SHIPBUILDING CORPORATION
Tacoma Division—Tacoma, Wash.
Foot of Alexander Ave.
President: R. J. Lamont.
Vice Pres. & Gen. Mgr.: O. A. Tucker.
Chief Engineer: James F. Goodrich.
Purchasing Agt.: Howard J. Flanders.
Seattle Division—Seattle, Wash.
2400-11th St., S. W.
President: R. J. Lamont.
Vice Pres. & Gen. Mgr.: E. B. Colton.
Secretary: R. L. Dalton.
Chief Engineer: F. G. Greaves.
Purchasing Agent: C. E. Bothwell.

SHAIN MANUFACTURING CO., THE
2520 Westlake No.
Seattle, Wash.
Owner and Manager: M. G. Shain.
Purchasing Agent: Stanley Young.
Superintendent: Al Johnson.
Superintendent Machinery Installation: Ray Miller.
Carpenter Shop Foreman: Emerald Baunsgard.
Paint Shop Foreman: F. J. Selber.

SHIPYARDS, INC.
Blaine, Washington
President: Andrew Berg.

SILETZ BOAT WORKS
Kernville, Oregon
President: E. M. Gerttula.

SMITH BROS. BOAT WORKS
226 21st St.
Newport Beach, Calif.

R. M. SMITH & SONS
Bayview, Washington

SOUTH COAST COMPANY
Newport Beach, Calif.
President: Walton Hubbard, Jr.
Vice Presidents: Dr. Walton Hubbard and Walter Franz.
Manager: Hubbard C. Howe.
Purchasing Agent: Walter Franz.
Chf. Engineer: Charles A. Blakely, Jr

STANDARD SHIPBUILDING CORP.
Los Angeles Harbor
P. O. Box 271
San Pedro, California
President & Direc.: J. A. Cosmas.
V. P. & Direc.: G. Logothetis.
Treas. & Direc.: J. Y. Leveque.
Hull Superintendent: George Bonner.
Wood Const. Supt.: H. C. (Chris) Hansen.
Chief Engineer: A. M. Nakk.
Naval Arch.: W. C. Allen.
Purchasing Agent: J. L. de Haaff.
Controller: J. B. Miles.
Director, Sales Div.: D. H. Moore.
Empl. Mgr.: John Marshall.
Industrial Manager: J. M. Carras.

STANWOOD SHIPYARDS
Stanwood, Washington
President: H. S. Kelsey.
General Supt.: E. H. Thorsen.
Hull Supt.: E. M. Fields.
Purchasing Agent: Wm. H. Ke[illegible]

STEEL CONSTRUCTION CO.
Ft. of S. W. Curry St.
Portland, Ore.
President and Mgr.: F. E. Owen.
Treasurer: E. J. Secord.
Comptroller: A. N. Haradon.
Naval Architect: Phillip Mitchell.
Chief Engineer: Frank A. Tabor.
Purchasing Agent: E. J. Secord.
Superintendent: Ray Lewis.

STEEL TANK & PIPE COMPANY
Columbia Blvd.
Portland, Oregon

STEINBACH IRON WORKS
Tillamook, Oregon
Pres. & Gen. Mgr.: John L. Steinbach.
Vice Pres.: David E. Steinbach.
Secretary: Margaret Hallstrom.
Treasurer: O. A. Hallstrom.
Purch. Agent: C. E. Douglas.
Superintendent: Thomas Thompson.
Asst. Supt.: Steven J. Peltzer.
Naval Arch.: Henry K. Middleton.

STEPHENS BROS. INCORPORATED
345 N. Yosemite St.
Stockton, Calif.
President: R. R. Stephens.
Vice President: Richard T. Stephens.
Manager: Theodore Stephens.
Naval Architect: Richard T. Stephens.
Supt. of Construction: Kenneth J. Short.
Purchasing Agt.: John E. Gersbacher.

WILLIAM F. STONE AND SON
2517 Blanding Ave.
Alameda, Calif.

STURDGEON-ARNOLD BOAT BUILDING CO.
Kendall Station, Oregon

TACOMA BOAT BUILDING CO.
2142 East D St.
Tacoma, Washington
Owners: Thos. R. Astrom & H. Dahl.

TACOMA TUG & BARGE CO.
Puget Sound Freight Sheds
Tacoma, Washington

TODD SHIPYARD CORP.
Seattle Division
1801-16th Ave., S. W.
Seattle 4, Wash.
President: R. J. Lamont.
Vice President & Secretary: O. M. Lund.
Vice Pres. & Gen. Mgr.: J. D. Haynes.
Purchasing Agent: J. S. Robinson.

TREGONING BOAT COMPANY
6505 Seaview Ave.
Seattle, Washington
President & Mgr.: James I. Tregoning.
Purchasing Agent: Fred Hill.

R. J. ULTICAN SHIPBUILDING COMPANY
400 South F Street
Aberdeen, Washington
Yard: Cosmopolis, Washington
President: R. J. Ultican, Sr. (Partner).
Vice Pres.: R. J. Ultican, Jr. (Partner).
Manager: Lyle B. Easterly (Partner).
Purchasing Agent: Chas. Rosengarten.

UNITED ENGINEERING CO., LTD.
Foot of Main St.
Alameda, Calif.
San Francisco Office: 298 Steuart St.
President: R. Christy.
Vice Pres.: R. W. Macdonald.
General Manager: George Sutherland.
Naval Architect: E. J. Wegener.

UNITED STATES NAVY YARD
Mare Island, Calif.
Commandant: Rear Admiral Mahlon S. Tisdale.
Supply Officer: Capt. George P. Shamer (SC).
Commanding Officer, Naval Ammunition Depot: Capt. Nelson H. Goss.
Capt. of the Yard: Capt. Francis W. Scanland.
Commanding Officer: Colonel Maurice E. Shearer.
Yard Mgr.: Capt. Frederick G. Crisp.
Commanding Officer, Naval Hospital: Capt. John P. Owen.
Planning Officer: Capt. William E. Malloy.
Asst. Industrial Mgr.: Capt. Joseph W. Fowler.
Production Officer: Capt. Antonio S. Pitre.
Design Supt.: Adolph O. Gieselmann.
Public Works Officer: Capt. Floyd C. Bedell.
Machinery Supt.: Capt. Wilson D. Leggett, Jr.
Public Relations Officer: Lieut. (jg) D. E. Clark, Jr., USNR.

UNITED STATES NAVY YARD
Bremerton, Wash.
Commandant: Rear Admiral S. A. Taffinder, U.S.N.
Capt. of the Yard: Capt. L. F. Kimball, U.S.N.
Manager: Rear Admiral C. S. Gillette, U.S.N.
Production Officer: Captain P. B. Nibecker, U.S.N.
Planning Officer: Capt. W. A. Brooks, U.S.N.
Public Works Officer: Captain E. B. Keating (CEC), U.S.N.
Supply Officer: Captain S. J. Brune (SC), U.S.N.

VIC FRANCK BOAT COMPANY
Seattle, Washington
Owner: Mrs. Ruth Franck.
A. D. Lester.

VICTORY SHIPBUILDING CORPORATION
615 Coast Highway
Newport Beach, Calif.
President: Ray V. Marshall.
Vice President: A. M. Shaw.
Purchasing Agent: Frank S. Wade.

VIKINGS PORT
900 Coast Highway
Newport Beach, Calif.

WASHINGTON TUG & BARGE CO.
Seattle, Wash.

WASHINGTON BOAT WORKS
Seattle, Washington
Mgr.: Ray L. Butler.
Purch. Agt.: P. G. Knox.

WEST COAST SHIPBUILDING AND DRYDOCK COMPANY
P. O. Box 388
San Pedro, California
Partner: O. F. Collinge.
Partner: James P. Fitzpatrick.
Partner: Frank Cavanaugh.
Asst. General Mgr.: C. E. Mussen.
Sales Engineer: Geo. Bradford.

Hull Supt.: Tom Keptner.
Marine Mach. Supt.: C. A. Swain.
Purchasing Agent: C. B. Lucas.
Shop Supt.: Joe Townsend.

WESTERN BOAT BUILDING CO., INC.
2505 E. 11th St.
Tacoma, Wash.

Partners: M. A. Petrich, H. M. Petrich, Martin Petrich, Jr., Allen Petrich.
Chief Engineer: Gus Nyman.
Purchasing Agent: Chet Ruff.

WESTERN PIPE & STEEL COMPANY OF CALIFORNIA
General Offices: San Francisco-Los Angeles

Chmn. of the Board: H. G. Tallerday
President: L. N. Slater.
Vice President: R. D. Plageman.
Sec.-Treas.: Reese Tucker.
Los Angeles—
Vice President: F. S. Howard.
South San Francisco—
Vice President: L. W. Delhi
San Pedro—
Manager: M. R. Ward.

WILLAMETTE IRON & STEEL CORP.
3050 N. W. Front St.
Portland, Ore.

President: A. M. Smith.
Exec. Vice Pres.: Austin F. Flegel, Jr.
Vice Pres. & Gen. Mgr.: W. A. Kettlewell.
Naval Architect: J. E. Carson.
Chief Engineer: J. R. Daley.
Purchasing Agent: C. L. Brainerd.

WILMINGTON BOAT WORKS
P. O. Box 756
Wilmington, California

President: Hugh M. Angelman.
Vice Pres.: Robert E. Carlson.
Manager: Hugh M. Angelman.
Chief Engineer: W. E. Greene.
Purchasing Agent: Charles E. Dayton.
Secretary: E. E. Marrs.
Personnel Mgr.: James B. Valentine.

WILMINGTON IRON WORKS
Wilmington, Calif.

Pres.: Walter C. Richards.
Chief Engineer: Samuel E. Hood.
Purchasing Agent: Peg Andrae.

WINSLOW MARINE RAILWAY & SHIPBUILDING CO.
655 Empire Bldg.
Seattle, Washington

Exec. Vice Pres.: Jas. F. [illegible]ths.
Vice President: H. A. [illegible]
Manager: C. M. Sigle.

WRANG SHIPYARD
1811 Eldridge Ave.
Bellingham, Wash.

President: G. Wrang.

New Steamship Operators

A new steamship company has been formed under the name of American Trading and Shipping Co. of San Francisco. President is John Raymond, head of American Trading Co. Jack Hook, former district manager at Los Angeles for McCormick Steamship Co., is general manager of the new firm, which will act as a general agent for domestic and foreign lines.

Burgess-Manning Organization

Burgess-Manning Company was incorporated on January 26, 1944, and, as a subsidiary of Burgess Battery Company, assumed the activities of the Acoustic Division of Burgess Battery Company on January 31.

The newly-elected officers are W. L. Manning, president; D. W. Day and R. L. Leadbetter, vice presidents; J. E. Lutz, treasurer; H. H. Darbo, secretary; E. D. Woisard, assistant treasurer and assistant secretary.

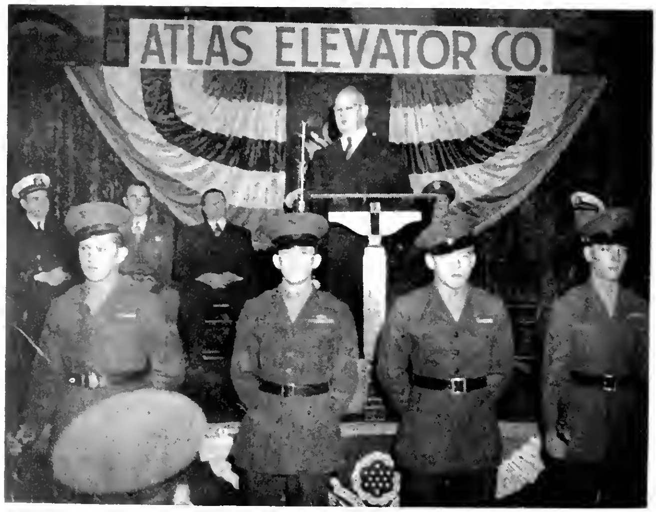
The transfer involves no change in either personnel or policy.

Products include: Burgess Exhaust and Air Intake Snubbers used on heavy duty stationary and marine type internal combustion engines; Burgess Acoustic-Booths to facilitate communication in noisy industrial and marine locations; and "Typha," a lightweight filling material for cushions, life preservers and flying suits.

Army-Navy "E" Awarded to Atlas Elevator

At ceremonies of the Atlas Elevator Company, San Francisco, on February 22, Captain Antonio S. Pitre, U. S. N., presented the Army-Navy "E" pennant to the company's president, Thomas E. Ambrose. Representatives of the U. S. Marine Corps, U. S. Coast Guard, U. S. Army and U. S. Navy attended the ceremony with many of the employees and guests.

The Atlas Elevator Company are manufacturers of marine valves, valve manifolds, rigger's vises, passenger and freight elevators, hoisting equipment and ship elevators.



Marine Exchange NEWS of the MONTH

by M. A. Cremer, Manager

Parker Elected

John Parker, president of the merican Marine Paint Company, as elected by the directors of the larine Exchange to fill the vacancy n the board created by the resigna- on of Joseph F. Marias.

Mr. Marias, formerly chairman of e State Board of Harbor Commis- oners, now resident in Los Angeles, executive vice president of Los An- eles Tankers Operators, Inc. His evious position was chairman of the oard of State Harbor Commission- s in San Francisco.

New Members

The expanding activities of the larine Exchange, and the need to rry on additional work, has brought e support of many new members. The following have recently been lmitted to membership:

Barrett & Hilp, Bay Cities Asbes- s Co., Dee Engineering Co., L. & E. manuel, Inc., Gamlin Chemical Co., eneral Machinery & Supply Co., inchman, Rolph & Landis, Kaiser ompany, Robert L. Johnson Co., slyn & Ryan, Luce & Company, arelco, Inc., J. E. Peggs Company, F. Foreign Freight Forwarders, c., S. F. Museum of Science & In- istry, Standard Distributing Co., vett & Crawford, J. T. Thorpe & n, Western Fire Equipment Co.

World Trade Center

The World Trade Center project making definite progress. Over ty associations have expressed a de e to cooperate in materializing it.

A group of trustees and a secre- tary have been selected by the For- eign Trade Association and the San Francisco Chamber of Commerce. The first duty of the trustees will be to form a nonprofit corporation to prepare plans for financing, acquir- ing property and for construction work.

The trustees and secretary selected are:

Leland W. Cutler—Fidelity & De- posit Co.

A. H. Jacobs—Jacobs, Malcom & Burt.

Hon. Edward H. Tickle—Banker, State Senator and chairman, State Central Republican Committee.

Ira S. Lillick—Lillick, Geary, Olson & Charles.

O. C. Hansen—Frazar & Hansen.

Ray B. Wiser—Pres., Calif. Farm Bureau Federation.

Harry S. Scott—Pres., General S. S. Corp., Ltd.

Frank S. Runyon—President, S. F. Furniture Exchange.

Wm. G. Merchant—President, Downtown Association.

Frank B. Modglin—President, Builders of the West.

Ernest Ingold—Ernest Ingold Co.

Harvey Hancock—Assistant to the President, United Air Lines.

Leland M. Kaiser—Kaiser & Co.

M. J. McCarthy—President, S. F. Foreign Freight Forwarders, Inc.

A. McKie Donnan—Brisacher, Van Norden & Staff.

For Secretary

M. A. Cremer—Manager, Marine Exchange.

The project is creating consider- able interest throughout the country. Articles on it have appeared in the New York Times, the Journal of Commerce of New York, the Chris- tian Science Monitor of Boston and in several export and marine publica- tions.

Foreign Trade Zone

The Board of State Harbor Com- missioners has renewed its applica- tion for a foreign trade zone. It has given the Foreign Trade Zones Board, in Washington, D. C., a choice of two sites: Pier 92 and Mis- sion Rock.

The previous application filed in 1936 offered Pier 45 for the location of the zone. This site was not ac- cepted by the Foreign Trade Zones Board, because it presented no possi- bility of expansion on the shore side which is occupied by Fishermen's Wharf. It was also rejected because the fishing activities adjoining it would make guarding the proposed zone difficult.

Pier 92 is an open wharf, immedi- ately to the east of Pier 90. Both are located on the south shore of the mouth of Islais Creek, just east of the Third Street Bridge.

There is sufficient unused open space adjoining Pier 92 to the south. Some of this adjacent property is oc- cupied on the bay shore to the east with three fish canneries and a large short wave radio station.

Mission Rock is just off Piers 48 and 50 to the east. It was recently purchased by the State Board of Har- bor Commissioners for $120,000. The pinnacles of Mission Rock were not included in the sale. They belong to the United States Navy, which had previously been on record as willing to dispose of them. Congress had also given its approval to sale of the pinnacles by the Navy. However, the Navy Department in Washing- ton, D. C., recently decided to retain the pinnacles. Efforts are now being made to have the Navy change its position. The pinnacles comprise 15/100 of an acre. Mission Rock it- self when developed would provide 14 acres and berths for seven cargo vessels.

Development of Mission Rock will probably not now take place until after the war. Recent plans to secure $6,500,000 from the Lend-Lease Ad-

ministration to construct the facilities planned and for use during the war, were shelved when the Office of Defense Transportation refused to grant priority for the movement of the needed construction material.

The Mission Rock project is number one in the post war plan of the Board of State Harbor Commissioners. It could well serve as an excellent site for a foreign trade zone.

At present the Marine Exchange is waiting word from Senator Hiram Johnson and Congressmen Richard J. Welch and Thomas Rolph as to the next move regarding the Mission Rock pinnacles. Advice has come from Washington that Admiral Ben Morrell has promised a rehearing.

Foundation of Pacific Inter-Relations

Plans originating over a year ago with Vice Admiral John Wills Greenslade, then commandant of the 12th Naval District and the Western Sea Frontier, to form in San Francisco an Army and Navy War College for formulating war and post war plans for the Pacific area are bearing fruit.

Since the activities of such an institution would be preponderantly civilian, it is now planned to organize in collaboration with the Institute of Pacific Relations, a Foundation of Inter-Pacific Relations. The head of the foundation will be Dr. Ray Lyman Wilbur, and the executive director will be Ernest B. Price. These two men hold similar positions in the Bay Region Division of the Institute.

The foundation will provide the funds necessary for a building to house and carry on the institute's activities. It will be a holding company financing and supervising the work of the institute in San Franciseso.

The long-range aim of the foundation is to make readily available the information necessary to prevent future wars in the Pacific area, which in this case includes India. It really means establishing here a capital, where the future of the countries of the area is decided. The foundation will prevent a repetition of the great lack of information with which the country and the Army and the Navy were faced after Pearl Harbor.

The foundation should prove to be a big help to manufacturers, exporters and importers, in making their future plans for business activities throughout the Pacific basin.

Bay Area Maritime Committee

The Bay Area Maritime Committee, composed of representatives of the eleven counties of the Bay Area, is preparing a plan whereby each county would present a standard set of statistics and other vital information for the entire area. This calls for one figure on population, one of waterborne tonnage, etc. The purpose is to avoid a repetition, for example, of the separate tonnage figures for San Francisco, Oakland, Richmond, Stockton, etc. This stating of separate port figures has been used to the area's distinct disadvantage by such ports as Houston and one other neighboring community.

The Committee has been functioning now for over a year and half. It has done much to remove mistrust and suspicion in the area of one community as regards the others It presents an activity of which the members of the Marine Exchange can be justly proud. The Exchange has not only helped to organize the committee but to finance and carry on its activities.

Pacific Marine Review

APRIL
1944

Pacific MARINE REVIEW

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MEMBER AUDIT BUREAU OF CIRCULATIONS

Official Organ
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Pacific MARINE REVIEW

Liberty Ships Are Good Average Ships

After publishing our last month's editorial comment, entitled "Cracking Down on the Cracks," our attention has been directed to a very fine statement on this subject made by Congressman Schuyler Otis Bland, longtime chairman of the House Committee on Merchant Marine and Fisheries. Part of this statement we present here as editorial comment for this issue.

Liberty ships, famous with the public for their mass production on the weld type of construction, and for meeting critical need of prosecution of the war, are also making fine records in service, the story of which cannot be completely told until after the war.

Some rumors are prevalent in certain shipyards and port areas which question the structural strength of Liberty ships, as well as tankers, ore carriers and other types. I desire to present the following facts:

Structural difficulties due to welding on vessels being built by the Maritime Commission have been thoroughly examined and, considering the large number of ships that have been built, are relatively few.

Of the over 2200 ships delivered into service in 1943, only 3.29 per cent have suffered damage to the main hull structure because of the stress of wind, weather and the seas, and ships have suffered such damage ever since man put his craft on the sea.

Only 4 out of 1776 Liberty ships were so severely damaged in very heavy weather that they foundered and became total losses. This is only 0.224 per cent of the total Liberty ships placed in service up to the end of 1943. One of these vessels, shortly before sailing on her last voyage, was subjected to heavy bombing attacks and suffered a number of near misses by bombs. With the exception of the 4 vessels lost, practically all damaged vessels have been repaired and are again in successful operation.

There have been no losses of personnel except in one case of a vessel foundering in Alaskan waters. A lifeboat, containing 10 members of the crew abandoning the ship, has not been accounted for.

In comparing yards where welding is largely used, a careful examination has shown that percentagewise there is little preponderance of one yard over another for ship failures. The structural difficulties have been fairly well distributed throughout the United States, and this includes yards which are credited with a production of a large number of ships.

Viewing the subject from the type of ships, the highest percentage of failures took place in the ore carriers, which are built on the Lakes; most of these casualties were corrected during construction, and all are operating satisfactorily.

In emergency production on such a vast scale, and with the great increase in the employment of welding, many difficulties were faced, and most of them have been overcome. In the spring and summer of 1943 a number of corrective steps were taken which will materially reduce the number of structural failures. Today difficulties are generally found in those ships built previous to the application of these corrective steps. If ships are already in service, corrective changes are made when they are next in port, but it is necessary to keep in mind that there must be a minimum of interference with the demands for transportation during these critical days of the war.

In order further to remedy this situation, instructions have been issued by the Maritime Commission to all yards building Liberty ships to make additional modifications, which, it is believed, will prevent any small crack in plating which might develop, because of locked-up stresses or other causes, from growing into a serious matter. These instructions have also been issued to make similar modifications on ships in commission, which will be carried out as rapidly as practicable.

Proper loading of vessels, especially when they operate in ballast, is an important factor. Many months ago specific instructions were given as to proper loading, and in most cases these instructions have been carried out. In a few cases improper loading has definitely contributed to failures.

While the Maritime Commission records are far more complete on ships built by the Commission than they are on other ships under United Nations flags, it is a matter of common knowledge that structural failures occur in riveted ships: the percentage of such failures involving the loss of the ships is about the same as for the welded ship.

It might not be amiss to point out that:

(a) Failures are more apt to occur in winter than in summer, and have occurred more frequently in high northern latitudes than in any other part of the world.

(b) Failures have occurred more frequently where the ships are in ballast than when loaded.

(c) In less than 10 per cent of the failures have they occurred a second time, and these have been minor in character, and have occurred in different parts of the ship.

WAR *Activities* OF A *Shipyard*

SUN SHIPBUILDING & DRY DOCK COMPANY DELIVERS THE GOODS

Bow view of a T-2 tanker.

THE SUN YARD at Chester, Pennsylvania, is making a tremendous contribution to our war effort. In October of 1943 this was expressed very forcibly by its president, John G. Pew, who stated:

"To speak of Sun Ship's contribution to the war effort is to speak of every worker in this organization of 35,000 men and women. It is to consider their working efficiency and the purchase of war bonds. The results from these efforts is the production of ships and equipment for our Army and Navy."

To make this statement more specific, we must consider the pre-war activities of this yard and then its present accomplishments:

The Sun Shipbuilding & Dry Dock Company had its inception in early 1916 as a 5-way yard. Although it was not considered a war yard then, it did play an important part in the shipbuilding program during World War I. The yard has a historic background, in that shipbuilding has been carried on continuously for more than a century in this immediate vicinity. The famous Roach Shipyard was in Chester, very near the site of the Sun plant. The home of Admiral Farragut was on the very ground where a part of the plant is now located.

Emergency Expansion

Shortly after the close of the last war, the yard was increased to eight ways; drydocks and ship repairing facilities were added; and tankers and merchant ships of all types were built. In March, 1941, the expansion program began, and from that date the yard rapidly grew to between three and four times as many ways, with many new buildings and much new equipment.

In 1940 the yard delivered twelve ships off eight ways, which was con-

ON THE FACING PAGE:

(1) The first large all-welded tanker constructed—521 feet by 70 feet by 40 feet; 18,105 deadweight.

(2) The Alchiba; twice torpedoed in the Pacific, she withstood fire and torpedoing, and is now back in service. Her main propulsion is a Sun-Doxford diesel engine.

(3) The Ohio, 485 feet by 68 feet by 36 feet; 14,140 deadweight; single screw, steam turbine. She succeeded in carrying oil to Malta under severe bombardment from the air and torpedoing from submarines.

(4) High-speed tanker built prior to America's entry in the war. Restrictions do not permit details to be published.

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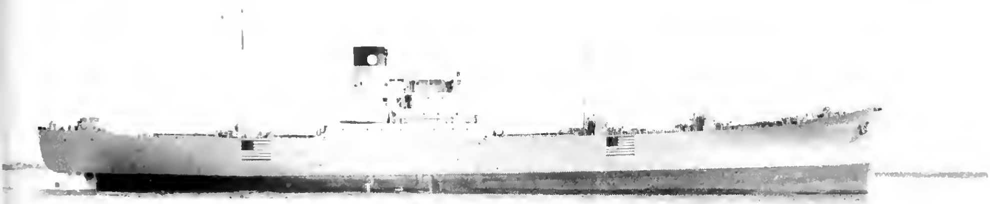

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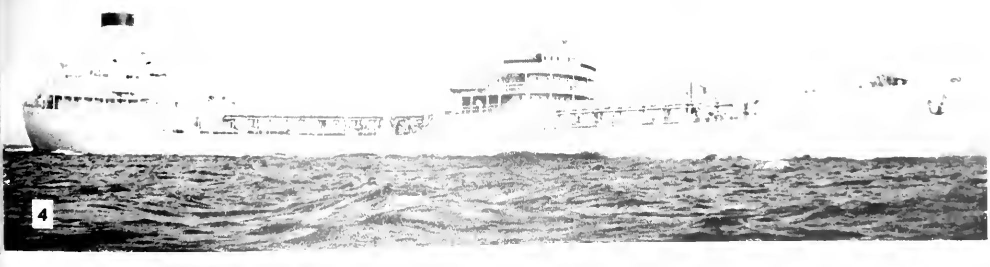

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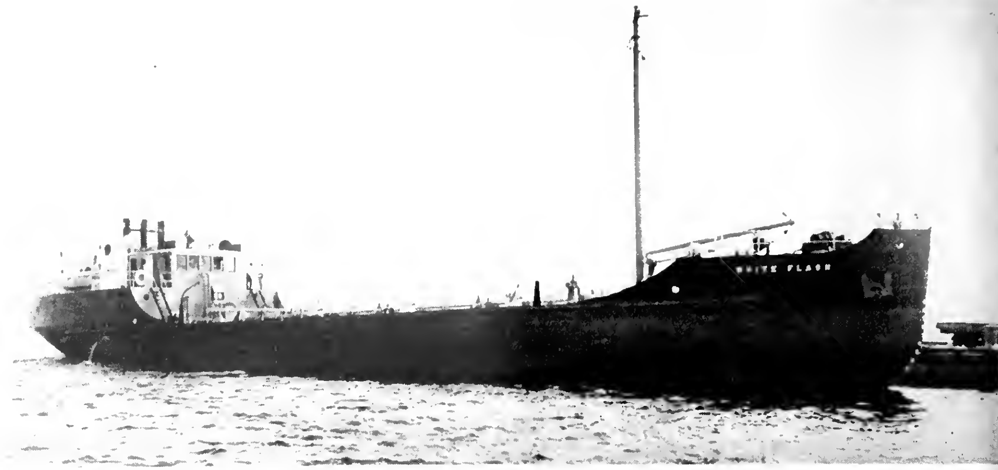
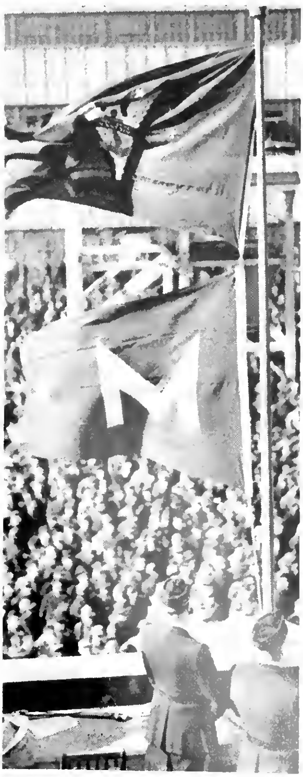


White Flash, first all-welded tanker ever built in America. A single screw, diesel-electric ship, she measures 190 feet by 34 feet by 12 feet, and is of 887 deadweight.

Below: A group of workers at the presentation of the Maritime "M" award.



sidered at that time a substantial output for any shipyard, and also, which is equally important, that amount of tonnage about met the demand from the oil industry and other mercantile concerns. During that period 6000 to 6500 men were employed. Today the task has grown to such abnormal proportions that it is difficult to realize, except in a general way, unless we give close comparison to present activities of this mammoth shipyard.

The building of a shipyard from eight ways to 28 ways, with the many buildings, shops and equipment, and at the same time to carry out the increased shipbuilding schedules and the building of the necessary organization, is a feat rarely accomplished in so short a time.

The company was among the first yards to build ships for the Maritime Commission, its first contract being signed on May 10, 1938. Since then there have been built and delivered to the Maritime Commission and to private concerns tankers, cargo ships and refrigerated ships, among them some of the largest refrigerated ships ever built in this country.

Contracts now under way for the Maritime Commission amount to many tankers and cargo vessels, all of which are among the largest and best of their types. Since the war there have been built vessels with three types of drive: direct diesel (with engines up to 10,000 hp); turbo-electric, and geared turbine. The diversified phases of shipbuilding necessary to build these several types of ships simultaneously are not conducive to the highest production records, but are vital and must naturally be carried out at the older and more permanently established yards best suited for the many advanced engineering and construction methods now so necessary for an overall shipbuilding program. The Sun yard had done a tremendous amount of development and engineering work which was passed on to the newer yards as part of its ready contribution to the Maritime Commission shipbuilding program.

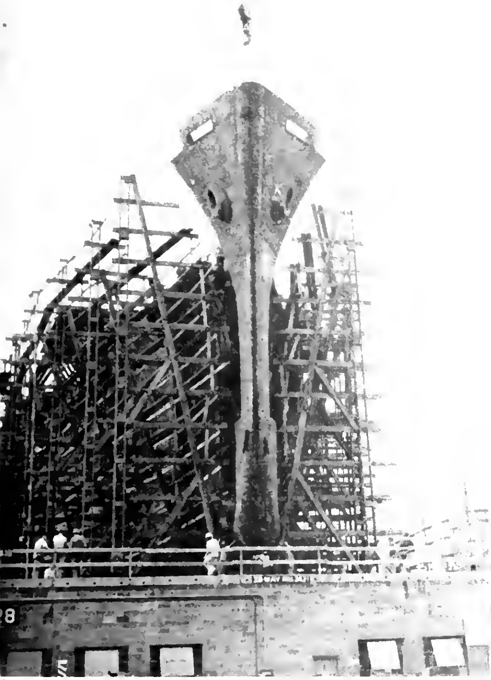
Recognition

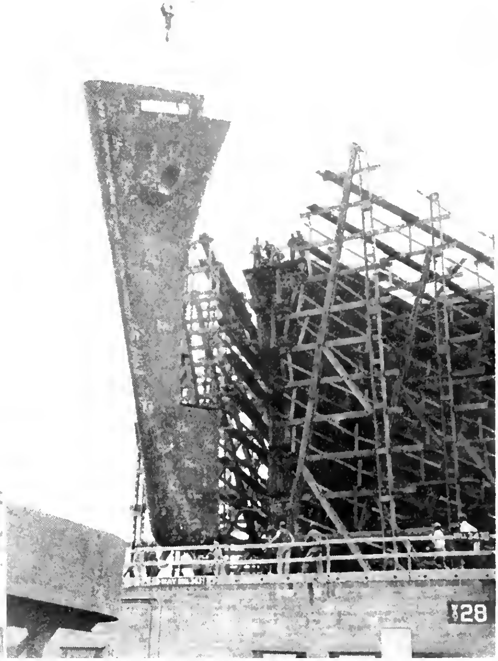
Recognition of the shipyard's record in production came on March 23, 1943, when the U. S. Maritime Commission pennant of merit, the "M" award, was won by the yard and its employees. On September 3 of the same year a gold star for continued outstanding merit in ship construction was added to the flag by the Commission.

The table on page 62 will show some of the production and growth of this yard.

ON THE FACING PAGE:

Three views of prefabricated bow sections, and a view showing bulkheads prefabricated into subassembly in the steel fabricating shops being moved to the shipways for assembly into the hulls.

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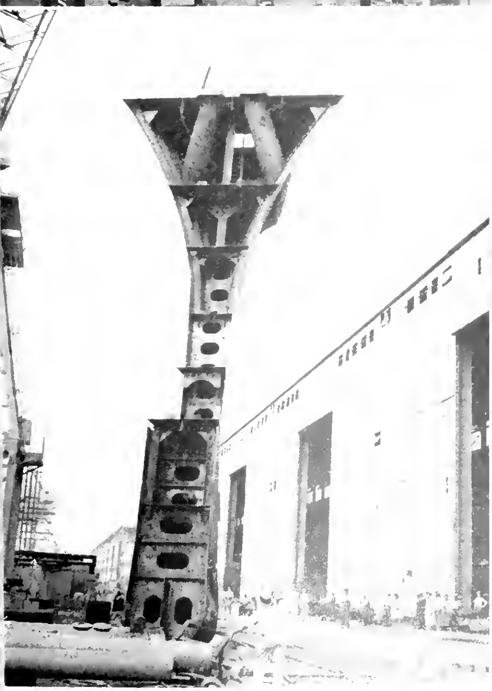
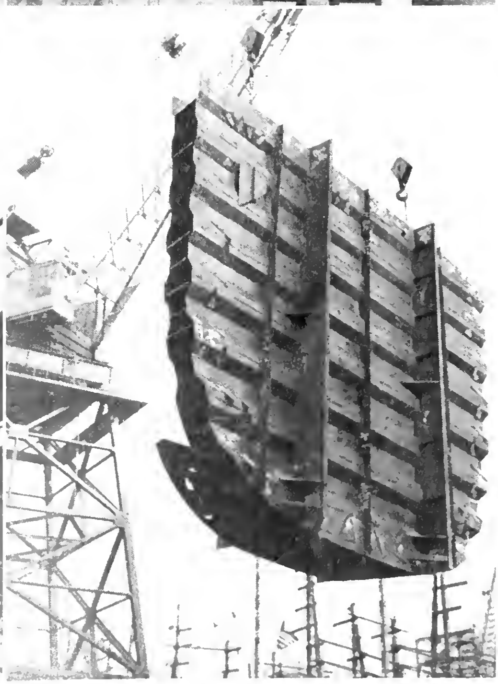




Sun Production

Year	Ships Delivered	Total Deadweight Tonnage	Total Shaft Horsepower	No. of Men On Roll End of Year
1940	12	166,659	91,700	7,077
1941	15	213,258	104,000	13,640
1942	46	711,542	332,600	30,198
1943	72	1,195,500	540,500	33,000

Among the ships with outstanding war records which were built at this yard were the Ohio and the Alchiba.

The S. S. Ohio, a tanker, was originally built for The Texas Company. It is now well known how she withstood Axis bombardment from the air and submarine torpedoes to deliver desperately-needed petroleum products to Malta in the darkest days of the bombings.

The motorship Alchiba, a cargo ship driven with the Sun-Doxford diesel engine, has been widely publicized because, being given up for lost, she is now back in active service, notwithstanding torpedoes and fire. This ship received a Presidential citation, and as the builders of the ship the company participated in this citation.

New Methods

The Sun Shipbuilding & Dry Dock Company has pioneered in many phases of shipbuilding that are now generally used. Among these are all-welded construction and the welded subassembly method of prefabrication. These phases, which had their inception and much of their development in this yard, are now greatly accelerating shipbuilding in practically all American shipyards.

The first all-welded tanker ever built in the United States was the S. S. White Flash, shown in one of our illustrations. Shortly after this the S. S. Vandyke, a 19,000-ton tanker, was built of all-welded construction. From these pioneer ships there has grown a whole new phase of ship construction.

Today automatic and manual welding has completely replaced riveted construction at the yard. The welding art here has had a steady development since the close of the last war, and is an outgrowth of the welded pressure vessel for oil refining equipment, an outstanding product of Sun.

The development and building of the now famous Sun Doxford diesel engine has been advanced so that it now leads all other American diesel engines for main ship propulsion power.

These and many other features have been advanced, but they have not in any way been capitalized, and the yard takes no personal credit except pride in its contribution to the tremendous shipbuilding program which has become the life-line of the nation.

Ship Repair

In addition to this great shipbuilding program, a tremendous war contribution has been made by carrying on a great volume of ship repair work, entailing important drydocking jobs and other major repairs made necessary from enemy action. To keep existing ships in service is as valuable to our cause as building new hulls.

Very extensive damage repairs involving long periods on drydocks have been almost continuous, even to the extent of rebuilding a vessel of 19,000 tons deadweight that had to be docked in separate halves and later rebuilt anew for service, thus bringing a valuable ship into use again in a few months' time. The volume of ship repairs of every kind has demanded unremitting service to meet the emergency attached to this class of work.

Parts for engine and machinery repairs to help keep existing ships in service are being shipped from the yard to many other ports: fabricated hull steel to one place; stern frames and rudders to another; and wheels, shafts and diesel engine parts to a third. A huge amount of this class of equipment and parts continues to go to other yards and ports without notice or special publicity.

Diesel Engines

In addition to the great volume of shipbuilding work in progress, the company has been fully employed in its Diesel Engine Departments building large Sun-Doxford units for many of the vessels constructed in the ship yard.

The pressure vessel department has made a substantial contribution to our war effort by producing a large volume of units for the famous Houndry process of manufacturing high-octane aviation gasoline and other petroleum equipment for many important projects.

The Sun yard, like all other yards and industries, has suffered seriously by the loss of men called into the armed service. It is readily understood that the continuous drawing of experienced men from the ranks of the workers, and the efforts to employ inexperienced hands, have presented serious difficulties in maintaining increased production. Very extensive facilities have been set up for training the men and women—from laborers up to and including foremen and leaders in all the branches of the industry—that make up the whole working force. Building a force from 6000 to more than 33,000 has been accomplished in less than two years.

Personnel

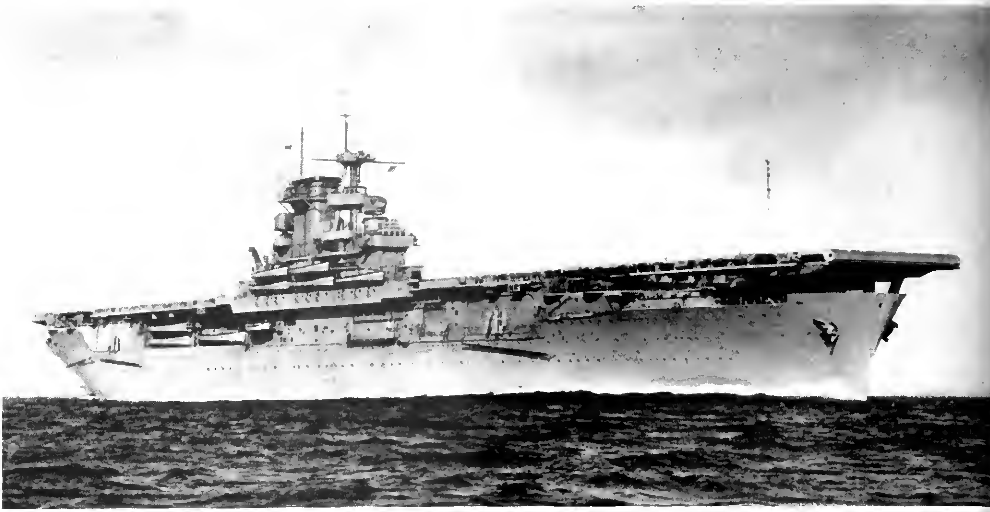
During peace time the management always has manifested a keen interest in the welfare of the employee, and for many years encouraged shop schools and apprenticeships in the various crafts. Early in 1937 a more extensive training program was put into effect. Shop schools have been established in welding, shipfitting and other shipyard trades. Many men and women have passed through these channels of training to take their place as mechanics in this expanding organization. The training program now comprises a large number of short-time classes covering the work of almost every department in the yard.

In addition to the shop schools, extensive use has been made of the facilities of the United States Office of Education. Every available means has been employed in training men and women.

America will win the war—not by accident of geographical location or abundant natural resources, but because all over America people are working together with the same undaunted spirit to win that animates the 33,000-man team working at Sun Ship.

ON THE FACING PAGE:
Repairing a ship damaged by torpedo.



Aircraft carrier Wasp, ship of a type that has revolutionized naval warfare.

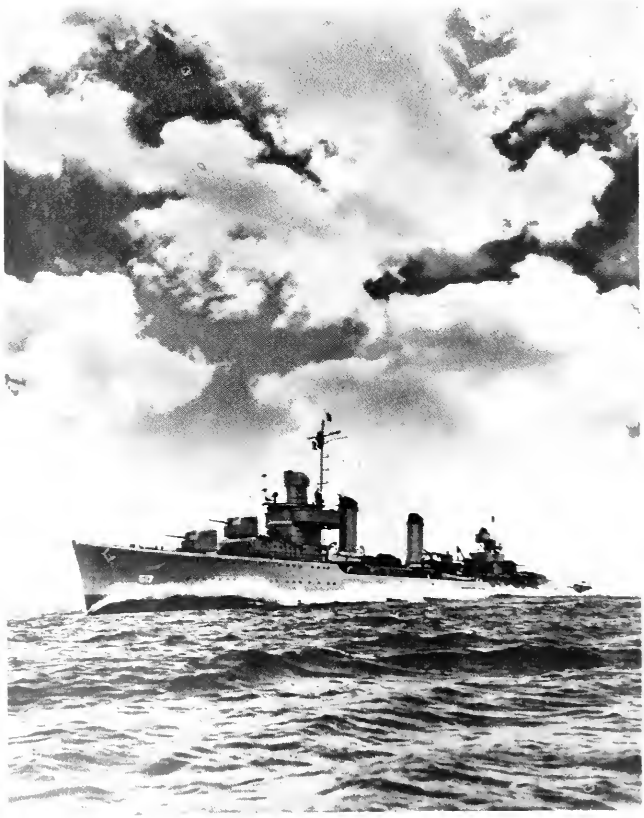
BETHLEHEM'S *All-Out* WAR PRODUCTION

Destroyer-escort Buckley, ship of a type built in a hurry to meet an emergency situation—the submarine menace in the Atlantic.

Heavy cruiser Baltimore, ship of a type said to be of greatest all-round utility in the Navy. These ships serve in major battle fleet operations, in task forces, in convoy service, in covering landings.

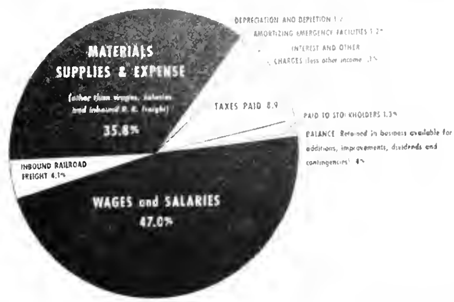
RECENTLY issued is a very remarkable report of the 1943 activities of the Bethlehem Steel Company, Inc., and its subsidiaries. The high lights of this report are given in the table herewith. Distribution of 1943 receipts is shown in the diagram. Very noteworthy in these graphs and figures is the very low percentage of gross income that eventually becomes net profit and the fact that this percentage is so much lower since Pearl Harbor. A further breakdown of these percentage figures shows that gross operating profit before taxes was roughly 13 per cent of total income. This figure would hardly be considered excess profit in any normal year. Of this gross profit: taxes paid represent 68.51 per cent, dividends paid took 10 per cent; depreciation was allowed 9.21 per cent, amortization was credited with 9.21 per cent; interest paid out equaled .07 per cent; and 3 per cent was retained for business contingencies.

The shipbuilding activities of this picture are truly amazing. Bethlehem yards delivered better than a new ship a day every day during 1943. In addition they converted, repaired, re

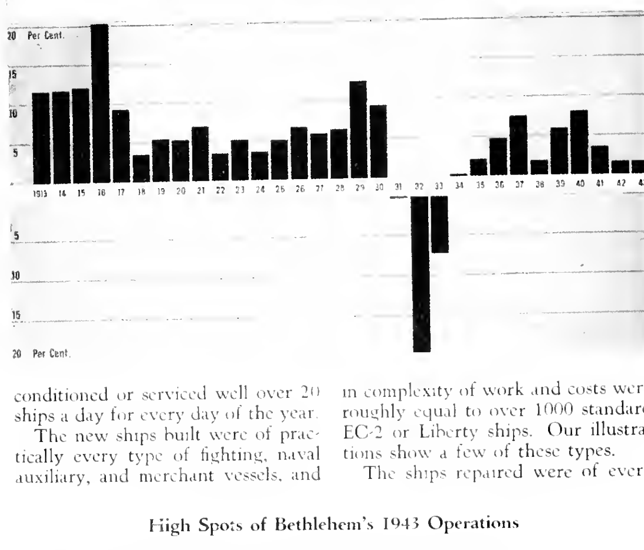


The destroyer Ordronaux. These ships probably have more fighting capacity per ton displacement than any other type of ship, having half again as much power as any of the older battleships in a vessel of about 1/16th the weight and bristling with torpedo tubes and rapid-firing guns.

Received in exchange for goods and services, $ 1,902,819,720



PERCENTAGE OF NET INCOME TO NET BILLINGS



conditioned or serviced well over 20 ships a day for every day of the year.

The new ships built were of practically every type of fighting, naval auxiliary, and merchant vessels, and in complexity of work and costs were roughly equal to over 1000 standard EC-2 or Liberty ships. Our illustrations show a few of these types.

The ships repaired were of every type and size, both naval and merchant marine. The repair and reconditioning jobs ran the gamut of ship experiences, from painting the bottom of a cargo carrier to welding a new end on a broken-backed tanker or complete conversion of a passenger or cargo ship to a troop carrier.

Perhaps the most difficult of all the problems involved in this tremendous task was training personnel. This job has been continuous, and is still going on. Some seventy thousand of Bethlehem's best young men have been drafted into the armed services. Replacements are constantly in demand. Twenty-five thousand women are employed, working in 53 types of manual work. Every approved form of training and instruction is used in this preparation for shipbuilding trades. Notable is the use of models made of transparent plastic. These models demonstrate the prefabrication, preassembly and erection of the various parts of the ship. Complete scale models of the yard show machine operation, flow of materials, handling of preassembled parts of ships, launching of hulls, and the operations at the outfitting docks.

Notwithstanding the large proportion of untrained workers and the pressure to get ships out in a hurry, Bethlehem has improved in safety. For the third successive year, time lost per thousand man-hours due to accident has reached a new low.

The Pacific Coast yards of Bethlehem have been responsible for a large part of this work. At the new Alameda, California, yard this firm is building for the U. S. Maritime Commission the largest merchant vessels yet built on the Pacific Coast.

The Union Plant, San Francisco, has expanded and is regularly turning out destroyers and destroyer escort ships for the U. S. Navy as well as handling an immense volume of ship repairs and reconditioning. At San Pedro the company is building destroyers and making records on repair jobs.

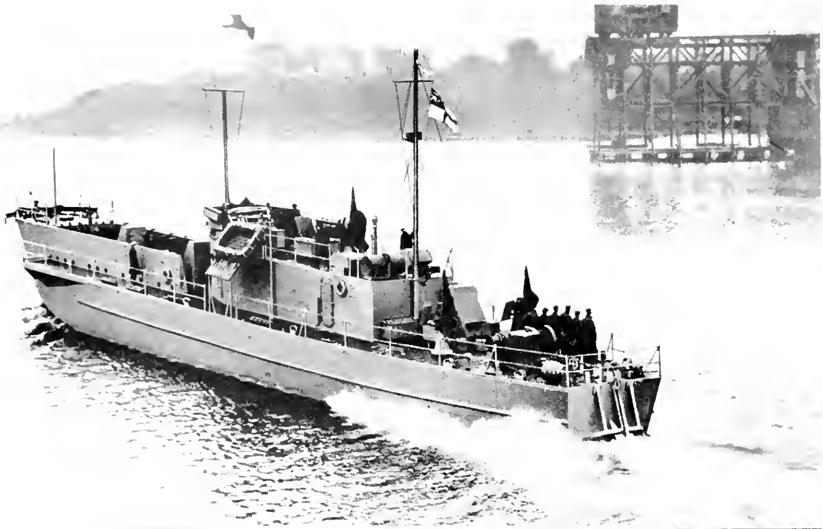
This record should be a source of justifiable pride to Bethlehem management and to Bethlehem personnel.

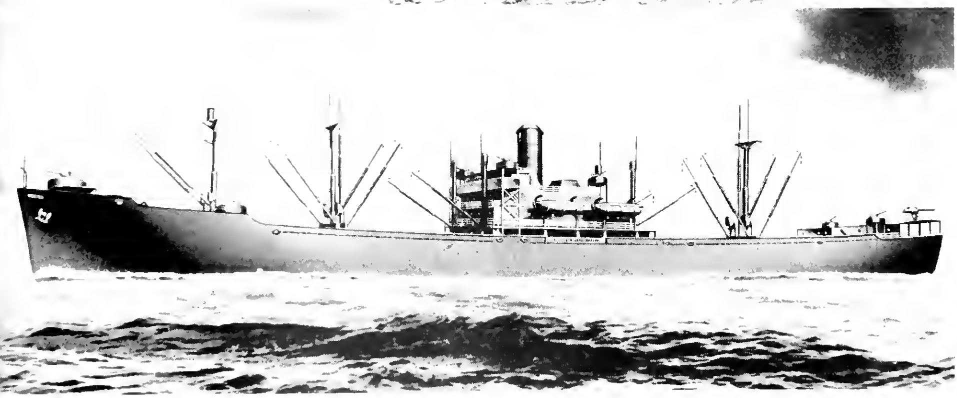
High Spots of Bethlehem's 1943 Operations

Fighting and cargo ships delivered in 1943		380
(Above ships equivalent in value to 1000 Liberty Ships)		
Ships converted, repaired or serviced		7,726
Total steel production	Tons	13,015,755
Plate production	Tons	1,938,897
Alloy steel production	Tons	1,661,388
Orders on the books December 31, 1943 (total)		$2,109,000,000
Orders for ships and ship repairs (unbilled balance)		$1,760,000,000
Orders for steel and ordnance		$ 349,000,000
Monthly average number of employees receiving wages*		289,232
Total wages*		$ 892,339,693
Average earnings per hour all employees*		$ 1.316
Average number of hours worked per week all employees*		45.0
Increase in Bethlehem employment during 1943		30,000
Total employment at end of 1943		300,000
Provision for tax payments		$ 167,236,300
Expenditures for additions and improvements to property		$ 48,332,283
Net income		$ 32,124,592
Per cent net income to net billings		1.69%
Dividends paid (Preferred and Common)		$ 24,432,473

* United States only.

ON THE FACING PAGE:
Top: LCI—Infantry Land Craft. Novel landing craft designed by the Navy for invasion of beachheads and other hazardous military operations.
Center: Victory ship, which can carry war cargoes faster and will be more suitable for post-war commerce.
Bottom: Faster and more efficient cargo ships for both war and post-war service are of this "C" type.





Testing tension of contoctor springs.

How to Maintain Motor Starters on Shipboard

by E. H. Hausler and L. E. Markle

Maintenance of motor starters on shipboard is influenced by operating conditions peculiar to marine applications. High ambient temperatures, the corrosive and electrical conducting properties of sea water, and high humidity, are examples of such conditions. Renewal parts (spares) assume much greater importance than would be the case for an equivalent industrial installation.

A well-planned maintenance program will recognize the equal importance of motor and control, since no motor-driven auxiliary is more dependable than the device which controls and protects its motor. This statement is made to emphasize the fact that motor starters are all too often assumed to require no inspection or maintenance whatever.

Preventive maintenance begins with the proper selection of the motor starter. If it is not suitable for the installation, or if it has insufficient capacity, maintenance troubles are inevitable. The initial inspection of a new installation should be thorough, and operation observed at load conditions before final acceptance is made. A time schedule for routine inspection should be established to meet the service requirements. As motors and their starters are always associated, a combined schedule can require inspection of both.

No Lubrication

Oil and grease should never be applied to the bearings of a contactor or relay. Experience has indicated that oil or grease will cause dirt to accumulate and eventually result in a sticky, gummy accumulation that causes sluggish action. The bearin[illegible] are designed with these requiremen[illegible] in mind, and no lubrication is r[illegible]quired on any part.

Bearing parts should permit co[illegible]tactors or relays to operate freely ar[illegible] without apparent friction. If par[illegible] are out of alignment and excessi[illegible] friction does exist, it should be elim[illegible]nated. Sluggish action will cau[illegible] electrical troubles. Monthly inspe[illegible]tions for severe service and semia[illegible]nual inspections for average servi[illegible] will do much to prevent bearing ar[illegible] friction troubles.

No bearings are required when t[illegible] moving parts of a contactor or rel[illegible] are relatively light and the magne[illegible] forces can be made strong enough [illegible] lift the movable parts vertically [illegible] close the contacts. This is an id[illegible] design as far as bearings are co[illegible]cerned. However, the moving pa[illegible] must be guided within the soleno[illegible] and non-magnetic guides must [illegible] used to prevent magnetic sticking a[illegible] sluggish action.

Mr. Hausler is service engineer [illegible] Electric & Mfg. Co., San Franci[illegible] Markle is motor control engineer with [illegible] East Pittsburgh, Pa., plant.

Poor Contacts

Although contacts are generally ought to be subjected primarily to ectrical duty, the mechanical duty equally important. Endurance tests e made with no current through the ntacts to observe how well they ithstand the pounding, rolling and ding or scrubbing action that occurs ery time the contacts close. Con ctor designs often provide a rolling tion of the contacts so that the cir iit is closed and opened on the con ct tips instead of on the closed con ct position.

When high currents that are diffi ilt to interrupt are expected, power l arc rupturing structures are sup ied to force the arc off the contacts nd quickly extinguish it. These arc ipturing structures are called arc oxes or blow-out structures. When operating position, they completely irround the contacts and must al ays be in correct position, to rup ire the arcs effectively. They are isily removed for inspection or re lacement of contacts.

Contacts should be renewed when adly burned or pitted and when orn thin. They should be clean but eed not be smooth. In fact, a clean ontact with a roughened surface omparable to coarse sandpaper is sat factory and provides as good, or etter, contact surface than perfectly mooth surfaces. If a contact surface pitted or burned and not worn thin can be cleaned and used again.

The method of cleaning is im ortant. Instead of filing, clean with indpaper or by buffing wheel. A fine le is permissible if the contact shape maintained. Emery paper should ever be used, as particles may ad ere to the surface and cause unnec ssary wear.

Silver contacts seldom require leaning. They may look black and irty because of the silver oxide, but s the oxide is a conductor, cleaning not often necessary.

When contacts are replaced, the irface against which they are bolted iould be thoroughly cleaned. This usually a current-carrying joint nd both surfaces should be clean any traces of copper oxide should be emoved.

The screws or bolts that hold co cts in place must be tight at mes. A loose contact surface off igh resistance and develops his action is cumulative, and ally causes contacts to melt and

Close-up view of direct-current contactor.

Worn or badly-burned contacts must be renewed.

CHECK CHART FOR MOTOR STARTER TROUBLE

TROUBLE	CAUSE	WHAT TO DO
Contactor or relay does not close	No supply voltage	Check fuses and disconnect switch.
	Low voltage	Check power supply. Wire size may be too small.
	Open circuited coil.	Replace
	Push button contacts not making	Clean and replace if badly worn.
	Interlock or relay contact not making.	Adjust and replace if badly worn.
	Loose connection or broken wire.	Check circuit with "flash light" (turn off power first!)
	Overload relay contact open.	Reset
Contactor or relay does not open	Push button not connected correctly.	Check connections with wiring diagram.
	Shim in magnetic circuit * worn allowing residual magnetism to hold armature closed.	Replace.
	Interlock or relay contact not opening circuit.	Adjust contact travel.
	"Sneak" circuit	Check control wiring for insulation failure.
	Contacts weld shut.	See "Contacts Weld Shut."
Contacts weld shut	Insufficient contact spring pressure causing contacts to burn and draw arc on closing.	Adjust, increasing pressure. Replace if necessary.
	Rough contact surface causing current to be carried by too small an area.	Smooth surface and replace if badly worn.
Arc lingers across contacts	If blow out is serious, it may be shorted If blow out is shunt, it may be open circuited.	Look at wiring diagram and see kind of blow out. Check to see if circuit through blow out is all right.
	If used, arc box might be left off or not in correct place.	See that arc box is on contactor as it should be
	If no blow out used, note travel of contacts.	Increasing travel of contacts will increase rupturing capacity.
Noisy A-C Magnet	Improper seating of the armature.	Adjust
	Broken shading coil.	Replace
Excessive Corrosion of contacts	Chattering of contacts as a result of vibrations outside of the control cabinet.	Check control pressure and replace spring if it does not give rated pressure. If this does not help, move control, so that vibrations are decreased
	High contact resistance because of insufficient contact spring pressure.	Replace contact spring.
Abnormally short coil life	High voltage	Check supply voltage and rating of controller.
	Gap in magnetic circuit •	Check travel of armature. Adjust so that magnetic circuit is completed.
	Too hot an ambient temperature	Check rating of contact. Get coil of higher ambient rating from manufacturer if necessary.
Panel and apparatus burned by heat from starting resistor.	Motor being started too frequently.	Use resistor of higher rating.

* D-C only
• A-C only

terioration of the entire contact assembly.

When contacts open and close, the rolling and rubbing action combined with the slight burning of a normal arc combine to keep the contacts bright and clean. If the contacts operate infrequently, the cleaning action does not occur and a covering of copper oxide develops. The heating oxidation cycle may start, and eventually overheating may develop even though the current or load is normal or less. For such conditions silver contacts will probably give better service, as silver oxide is a good conductor and heating does not develop. Silver contacts may also provide some relief in cases where a small overload condition is troublesome. They must, however, be used with some caution because they will not correct overheating caused by loose connections. As silver has a lower melting temperature than copper, silver contacts are more prone to become soft and "weld" or "freeze" together when subjected to high arcing temperatures.

Contact Pressures

The closed pressure of contacts is an important factor in their ability to carry current. A small contact with suitable contact pressure will carry more current than a larger one with little or no pressure. Renewal of thin contacts is required, as with wear they lose their contact pressure. It is important to keep the contact springs in good condition. Replace them if they have been damaged or have lost temper through exposure to high arcing temperatures.

A monthly inspection of contacts for pressure, available life, surface condition, temperature and tightness should suffice for normal conditions. For severe operating conditions a weekly inspection may be advisable.

Frayed Shunts

Shunts are generally flexible bands of woven copper strands that carry current from the movable contacts to a stationary stud. If the shunt is unduly bent, its strands break and cause additional loading of the remaining strands.

Shunts with broken strands should be renewed to prevent overheating. The terminal connections of the shunt should be tight. Shunt ends are frequently silver-plated or covered with special finishes to insure a clean contact surface of good current-carrying ability.

Training Technical Forces

by W. J. Prise

It is an established truth that the faster conclusion of the present conflict will depend to a great extent on the progress made in science and its application in various industries and on the battlefield. The developments in engineering and technology place an increasing demand for men familiar with new equipment and its principles of operation. Understanding modern materials and apparatus may lead to new inventions, new methods and new procedure, and generally will result in faster and better work.

In the rapidly-growing shipbuilding industry, the problem of familiarizing employees with the complexities of modern equipment was met by extensive training of personnel. The educational program undertaken at Moore Dry Dock Company, with the cooperation of the Engineering Science Management War Training office of the University of California, is a good example of this work, and has been extremely beneficial for training craftsmen. The training of electrical workers was intensified, and has resulted in considerable reduction in man-hours and better understanding of the job. Interest in the job has increased the joy of doing a task which is well understood.

Most of the classes were given to journeymen and leadermen. However, one class organized by the Electrical Engineering Department of the company—and again sponsored by the University of California—was set up with the idea of giving advanced training to the technical force of the company: the designers, engineers and supervisors.

The first requirement in any training is to develop leaders who will be able to carry the flow of information to the men in the field. The engineers, by their professional training and experience, are the leaders in industry. These technical men are most adaptable to accept the challenge of the enormous complexities of the technological world of today and tomorrow. Being the vanguard in the march of applied science, they are still handicapped at the present by the fact that they have to work in the various new fields which have grown with the demands for emergency operation of our plants and factories. Even if the engineer is working in his specialized field, he is still confronted with the problem of acquainting himself with the latest works in science serving the God of War. The information on new topics is either not available at all or is scattered through dozens of magazine articles, and superimposes a new burden of reading on the man working overtime and very much involved in daily tasks.

With the realization that the training of an engineer cannot be stopped at graduation, and that these men must be given an opportunity for continuous professional improvement, this advanced course was organized. The idea was to bring the special branches of engineering of importance in the shipbuilding industry to the attention of the company engineers. The class just completed covered in a brief form such subjects as fire control, degaussing, ship's service telephone, electric propulsion of ships, electrical features of the C-2 type of vessels (under construction at Moore Dry Dock Company), measurements, test instruments and testing procedures. In all these fields there exists a tremendous possibility for erroneous installation, which leads to extra expense in the elimination of troubles which could have been avoided by proper supervision.

The technical and supervisory personnel is largely responsible for training men on the job and for interpretation of blueprints on new equipment; and such men are called upon to explain the plans of operation and to locate and determine the cause of troubles. Practicability was the key [illegible] class; unnecessary theory was omitted, and ready formulas were stressed rather than their derivations. Theory was introduced mostly to make the student understand the significance and meaning of practical rules affecting installations.

In the case of fire control, for instance, the science of interior and exterior ballistics was briefly introduced to help the student realize the necessity and meaning of fire control equipment. In the lectures on automatic telephone, the propagation of sound was introduced. In the lecture on electric propulsion, the power requirements of the ship were brought to the attention of the audience. The best man in each field available in the Bay area among representatives of manufacturers of equipment and people working in the shipbuilding industry were selected as instructors. Each lecturer had a number of hours, depending on the scope and importance of his subject.

Certain problems like fire control and degaussing had to be limited to unrestricted information only; but in spite of that the material was of considerable assistance for students to realize the demands put upon such equipment so that they could be governed in their daily work by facts learned in the class.

One of the lecturers was assigned the duty of supervisor and coordinator. This cooordinator acted as an intermediary between the men in the class and the instructors. Each lecture was planned in advance so as to give the class information they wanted, and the material was being corrected in response to constructive criticisms of the students. This coordination was one of the factors which helped to keep students interested in the class.

Meetings were held after working hours, and all possible steps were taken to avoid inconvenience of missing rides, and for those who had time passes were issued so that they could obtain food outside of the yard. The coordinator also took care of all required records, substitution of instructors, and such matters, which relieved the rest of the instructors of the burden of necessary bookkeeping. Another benefit derived from this class was the bringing together of supervising foremen and the technical men in the design section to help develop both types of men, who thus realized the necessity of mutual understanding and cooperation.

A friendly discussion after formal

(Page 98, please)

The author is assistant chief electrical engineer, Moore Dry Dock Company, Oakland, California.

Shipyard Welding Arc Time Studies

AUTOMATIC WELDER CONTROL FOR ELECTRIC POWER SAVINGS AND MORE EFFICIENT PRODUCTION

by R. R. Dysart

TRUE TO the American spirit of competition in the world of sports is the spirit shown by the men and women welders working together on the home front. The man behind the welding rod has the same chance to knock off the enemy as does his son out there on the fighting front. On the fighting front, the boys measure their progress by miles advanced or the number of enemy planes shot down. In the shipyard, the men and women measure their progress by doing a better job of shipbuilding and more of it than they did yesterday.

Welding is one phase of the shipbuilding industry that contributes more than any other single activity in making our high rate of production possible. The man who can do a first-class job of welding takes special pride in his work, and he returns home after a day's work feeling satisfied that he has contributed his part in supporting the heroes in the foxholes that very day.

In order for the welders to measure their personal progress accurately, a new method of measurement has been introduced for industries using arc welding. Measuring arc time is the most helpful medium for the individual welder to check his own ability in quality as well as quantity production.

In the past, the only check that has been possible to make has been the footage or pounds of rod welded per man per shift. The footage method has been a rather poor check on a man's daily production; for example, a 3-pass weld gets credit for only one-third the footage that a single pass welder produces. Each man may work the same number of hours and put forth the same amount of effort, but their apparent production results will differ. It is almost impossible to measure accurately the footage each man welds per day or per week.

Measuring the individual's daily production on a poundage basis has its weakness similar to the footage method. For example, one man with a 5/16" rod doing down-hand welding can deposit a great deal more pounds of rod per day than another man using 3/16" rod on less accessible work. It may easily be seen why two men assigned to different kinds of work might put forth exactly the same effort and their apparent results measured on a footage or poundage basis be far apart. But by comparing their effort through the medium of arc time, their results would be identical, which is as it should be.

Arc time tables have been developed which show the correct burning-off time of each size rod. By comparing the time actually required by a man to deposit a given amount of rod with the time required as computed from the arc time table, a ready check is made to determine his relative quality of work. Too much time means he is burning his rod too slowly, and too short a time represents a higher burn-off rate than required for good quality work.

Arc time data are not only for the benefit of the individual welders, but serve as direct assistance to leadermen, supervisors, foremen, and management to keep their own respective houses in order. Almost without exception, the man behind the rod will work willingly and diligently all day long, but if his work has not been laid out properly for him in advance, he is not to be blamed if he must stand and wait. If a man deliberately holds back on the job to make it last longer or to spite the boss, his fellow workers will soon ostracize him, because each man realizes that each day the war is prolonged means a needless loss of hundreds more of our boys. Therefore management has a new opportunity to plan a more uniform flow of steel through the shops and better planning of the job to be done.

It should be clearly understood that the arc time totalizer is not for the purpose of putting anyone on the spot. It is a new tool which, when used properly, is an indispensable means toward an end. That end is victory, and it must be attained even with our limited man power supply.

Method of Securing Arc Time Data

Welding arc time data are secured by installing an arc time totalizing device on each welding machine. In the case of CP (Continuous Potential) machines, where several men are welding from the same generating source, the arc time may be measured

The author is electrical engineer, U. S. Maritime Commission.

by installation of the totalizing device on each welding circuit.

Recording of the data has been so simplified that a minimum of personnel is required to take arc time readings and compile the information which is so valuable to the production analysts.

Test Results

During January, 1943, nearly one hundred arc time totalizers were installed in the Plate Shop at Richmond Shipyard No. 1. For the first 60 days, observations were made and meter readings recorded. However, during that time little if any use was made of the data. But soon the welding superintendent and management began to take a keen interest in what might be possible, since they were now realizing that arc time data showed weaknesses otherwise undetected. By the simple application of psychology, the men behind the rod soon learned that the routine of checking their time gave each man an opportunity to take a measure of his own effort on the home front. Everyone, from management down to the last man, benefits from the results obtained.

With reference to Fig. 1, the improvement in overall production efficiency is tremendous. For example, in the Plate Shop, where weather is a minor factor, during February, 1943, the average arc time was 25%, and by August it had risen to 31%, other conditions remaining constant for all practical purposes. This represents approximately a 20% icrease in production without additional man power. Instead of each man working 20% harder or longer, he merely does his work more efficiently.

Electric Power Saving

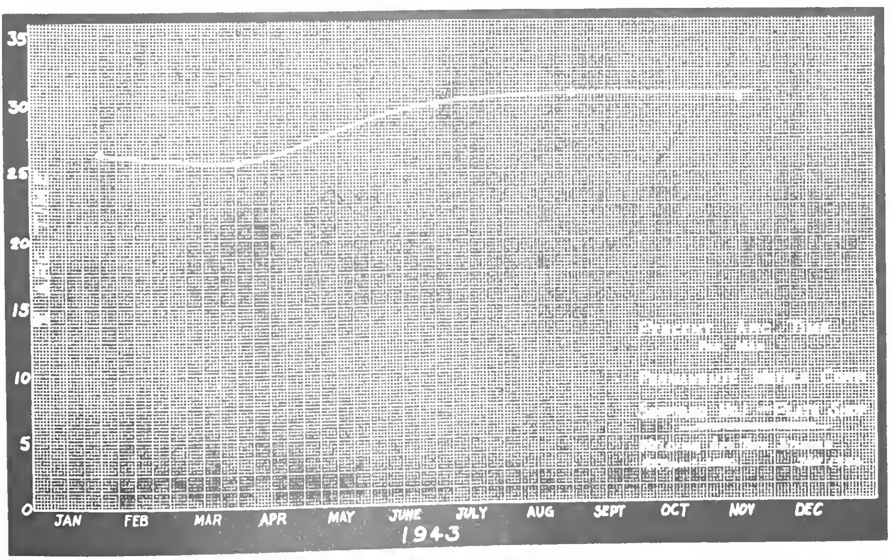
In most cases, especially with single operated welding machines, a control device is used which combines the arc time totalizing feature with an automatic control for shutting off the machine during the longer periods when no welding is being done. Even under the best operating conditions, 30 to 35% arc time is considered very good, and in most areas around the shipyard the percentage arc time is much lower. Therefore, it is evident that huge quantities of electric power can be saved by use of the automatic control.

For example, if an average of 25% arc time is assumed for a group of machines, then a reduction of approximately 1.5 kw demand is realized. On a three-shift basis, a saving of 30 kw hours per machine per day is made. From the standpoint of conserving the nation's natural resources, this saving is of great importance. The saving in dollars and cents to the American taxpayer is likewise of no small importance.

The novel design of the control units now available permits easy starting of the welding machine remotely. The welder merely touches his rod to the work when ready to start welding and the control does the rest. A time delay mechanism built into the control device prevents the machine from shutting down until after a two to three-minute period following each operation of the arc. This, for instance, permits the welder to change rods or to make minor adjustments to his work without needlessly stopping his machine.

The shipyard's average power factor is also very materially improved, since a large part of the no-load running time and resultant low power factor is eliminated. Commutator and brush wear are greatly reduced by cutting the total running time.

In conclusion, it is believed that the automatic welding machine control and the arc time totalizer are very noteworthy contributions to the shipbuilding industry. Their ability to save electric power and provide production data is of tremendous value to our present struggle, and will continue to make economies in our postwar industrialized world.



Development of Steel and Iron Shipbuilding in America

> **THE BANGOR**
>
> The following additional information on the S. S. Bangor was furnished through the courtesy of W. H. Collins, general manager, Fore River Shipyard, Bethlehem Steel Company, Inc.
>
> The Bangor, the first iron seagoing steamer constructed in the United States, was started at the Harlan, Pusey and Betts Plant—later the Harlan and Hollingsworth Corporation, Wilmington, Delaware, in October, 1843, and launched in May, 1844. She was about 131 feet overall with a 23-foot beam and a 9-foot depth. She had three wooden masts with jib and eight sails. There was a deckhouse aft with a comfortable saloon for passengers.
>
> The boiler was placed in the boiler hold, amidship, was 20 feet long and of the type known as the "drop flue." Fuel was stored in bunkers adjacent to the boiler hold. The machinery consisted of independent twin-screw engines having cylinders 22 inches in diameter with a 24-inch piston stroke. The propeller wheel was 8 feet 6 inches in diameter. On her trial trip she made an average speed of 10.6 miles per hour, her greatest speed being 14.07 miles per hour.
>
> The Bangor was burned on one of her trips, but was reconditioned and saw service in the Mexican War under the name of "Scourge."

By *A. J. DICKIE*

A Century-Old Iron Gunboat

Since writing the first installment of this series, our attention has been directed to an iron naval vessel that was started somewhat prior to the Bangor, described in that installment as the first American ocean-going twin-screw steamer built of iron. This naval vessel does not take that title away from the S. S. Bangor, the gunboat being a side paddle steamer launched on Lake Erie, all of her very long career on the active Navy list being on that lake.

Early in 1842, the U. S. Navy contracted with Stackhouse and Tomlinson of Pittsburgh, Pa., to build a steamer for use on Lake Erie and to be delivered on that lake. The plans and specifications of the Navy Department called for an iron hull 164′ 11″ long between perpendiculars, 27′ 0″ beam, and 9′ depth. This hull was to have a loaded displacement of 685 tons and was to be propelled by inclined two-cylinder engines driving side paddles. Each cylinder had a bore of 36 inches diameter and a stroke of 8 feet.

In 1908, Henry Penton of Cleveland wrote a short paper on this vessel for publication in the Transactions of the Society of Naval Architects and Marine Engineers. Of the machinery on this vessel he writes:

"Although of an antiquated type and despite their age and service, their condition is stated in the Bureau reports to be good, while that of many of the comparatively new ships is reported as 'fair' or 'condemned.' They are sufficient for the service required, however, and it is doubtful if even modern designs would be any more satisfactory for the limited duty. An old and rare work, entitled 'A Treatise on the Marine Boilers of the United States,' published in Philadelphia in 1851, supplies much interesting information regarding the Michigan in early years; she was then considered a remarkable ship. From this it appears that the original paddle-wheels were 21 feet 10 inches in diameter and had each 16 paddles or buckets. Each bucket was 7 feet 6 inches long, in two parts, and 25 inches wide, also in two widths of 15 inches and 10 inches, or four sections to each bucket. The dip of the wheels was 32 inches and the maximum revolutions 22 per minute. The draught of water was 7 feet 8 inches. The boilers were of the 'box' type, 8 feet 6 inches wide, 19 feet long, and 9 feet high, and the working steam pressure was 15 pounds per square inch. The work also includes drawings of the boilers which, while not very complete, are reproduced herewith. The boilers have been redrawn from the original cut which is not very clear in some respects, dotted lines and solid lines not very distinguishable and sections apparently unnatural, but the general design can be grasped. Evidently the smoke stack was common to both and thus must have involved much uptake work in the ship."

We can well imagine the difficulties that were faced by Stackhouse and Tomlinson in the fulfillment of this contract. Their shops were at Pittsburgh. Lake Erie at its nearest point is 150 miles north as the crow flies and was then 250 miles away by the dirt roads over the mountains. So everything that went into this vessel had to be prefabricated and partially preassembled at Pittsburgh and carted by horse or ox-team over these roads in the most laborious fashion to the little hamlet of Erie, Pa., where a building slip was set up for the erection of the hull. Bar frames, plates, beams, columns, forgings, castings, bolts, rivets, all engine parts, all boiler parts, all equipment, all fittings, all furnishings, were worked out at Pittsburgh, carried over to Erie and erected into this hull.

The firm name Stackhouse and Tomlinson long ago disappeared from the register of American industrial

firms but these men should be accorded a very high place in the annals of American iron shipbuilders. These contractors, of course, had one advantage over the modern U. S. Navy shipbuilder. The then U. S. Navy Department had no typewriters, no multigraph or mimeograph machines no radio or telegraph communications. All letters were written by hand and it is probable that 5 or 6 such letters finished the ship. Be that as it may, Stackhouse and Tomlinson wrought and erected so well that the vessel thus built was still on the active list of the Navy in 1938 at the ripe age of 94 years, with the same hull and same engines but with new boilers and new paddle-wheels.

This vessel was launched in 1844 and christened U. S. S. Michigan. As originally built she was rigged as a barkentine. Sometime in the eighties or early nineties of the last century her old boilers were replaced by a more modern type and her bunker capacity increased. This increased her draft to 9 feet and smaller diameter paddles were fitted. At this time the sail plan was altered to schooner rig.

For nearly 100 years she has been the sole representative of the U. S. Navy on the Great Lakes where her principal duties are "putting in an appearance at the chief lake ports to enlist recruits for the Navy, and acting as a drill master at the annual summer practice maneuvers of the naval militia of the Lake States." During this long career many a naval officer has stood watch on this vessel, has risen to high rank and then passed on to his reward, but the old ship still survives.

Perhaps the most noted of these officers from the viewpoint of the marine engineer was B. F. Isherwood, afterwards Engineer in Chief, U. S. Navy, and the father of modern American marine steam practice. As chief engineer on the Michigan, Isherwood carried out many experiments on the characteristics of steam, on heat radiation and transfer rates, and on insulation against loss of heat. The information derived from these experiments is still considered authoritative within its limits and formed the basis for much of the early American development in marine steam plants.

In 1905 Congress appropriated funds to build some battleships, one of which was to be named Michigan and to avoid confusion changed the name of this old gunboat to Wolverine.

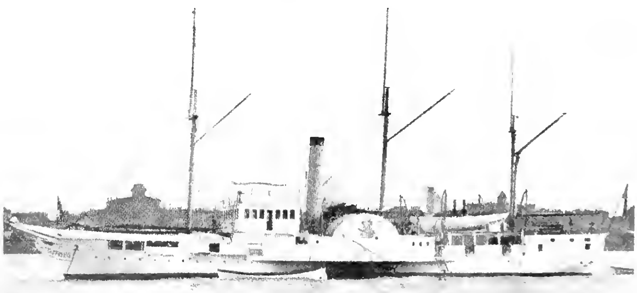
As the Wolverine, she is listed in the unclassified section of the Ships Data Book of the U. S. Navy as an "Old Gun Boat" and as being "in use for training purposes."

Another iron hull Navy steamer whose keel was laid in 1842 was the Princeton, designed by John Ericsson as a screw-propelled "frigate."

There are enough data on first iron vessels in America to show that by 1845 several American iron hulls were afloat and successfully operating. Our next installment will trace the developments down to the beginnings of modern steel hulls.

U. S. S. Gunboat Michigan in her original form.

Gunboat Wolverine (ex Michigan) about 1905 after change in paddles and rig.



Sketch plan of original boilers, U. S. S. Gunboat Michigan.

The tug Simmie, again on the side of the allies.

War Saga Of Tug Simmie

Union Diesel Works Under Four Flags

Few vessels involved in the present war have the distinction attained by the one-time tug Simmie, which has seen service under four flags—American, Philippine, Japanese and now Australian.

The Simmie's story came to light when a soldier serving in New Guinea sent a young woman in Oakland, California, a photograph of a captured Japanese landing barge with the notation that the vessel had a Union engine, manufactured in the United States. Oakland is the home of The Union Diesel Engine Company, and by coincidence the young woman knew an employee of that institution, to whom she showed the photograph.

He borrowed the snapshot and took it to his company executives. They immediately identified the vessel as one of two or three of its class for which they had supplied the Luzon Stevedoring Company of Manila with engines. Captain Albert T. Simmie, one of the owners of the stevedoring company, was in San Francisco, and on sending the picture to him he was able to identify the hull as that of the Simmie.

The Simmie was built as a tug and powered with a 225-horsepower 6-cylinder direct reversible diesel engine built by Union. She has a length of 72 feet, beam of 18 feet, and draft of 8 feet 3 inches. Her fuel capacity was 30 days' and her top speed 11 knots. She performed faithfully for her owners until the fall of Manila, when she was captured by the Japanese. One of her daily tasks was to tow a rockscow with a load of 500 tons over a distance of 30 miles every day, and a striking evidence of her pulling power was the fact that she averaged 6 knots on this tow.

The Japanese converted the Simmie into a landing barge and used her at New Guinea—and doubtless in other theaters as well. No doubt the Japanese planned to use her elsewhere but they reckoned without the allies, and when the Australians landed on New Guinea they captured her in almost intact condition. They are now using her as a general workboat.

Todd Record Since Pearl Harbor

John D. Reilly, president of Todd Shipyards Corporation, announced recently that 11,200 ships of all classes have been built, repaired or converted by the Todd Shipyards Corporation since Pearl Harbor in the company's ten plants on the Pacific, Atlantic, and Gulf Coasts. These vessels represent a total of 44,415,-600 tons of shipping.

West Coast Yards

West Coast yards of the Todd organization, located in Seattle and Tacoma, Washington, repaired or built 939 vessels, which figure is included in the totals above.

Outstanding in construction of war vessels is the launching of 34 aircraft carrier escorts by a West Coast yard, one of which, the U. S. S. Card, won a Presidential Unit Citation as part of a Navy task force which "sank more submarines than any naval team in history."

The report listed virtually every type of vessel plying the sea — including destroyers, aircraft carrier escorts, naval auxiliaries, submarines, mine-planters, troop and merchant ships, tankers, landing craft of various designs, and even whalers.

Of the more than 11,200 ships handled, 1937 vessels were tankers, the carriers of fuel vitally needed by ships, planes and tanks of the United Nations in every war-torn corner of the world. Other ships near the top of the list were: Harbor craft (all types), 1477; merchant ships, 1325; and small-type invasion craft, 1296.

First in the number of vessels handled was the Hoboken Division at Hoboken, New Jersey, where between December 7, 1941, and February 29, 1944, — the period covered by the report — a total of 4242 ships were either built, repaired or converted.

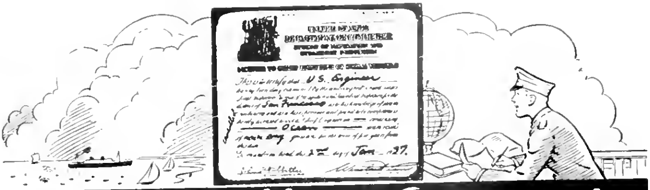
The Todd Brooklyn Division handled 1974 ships in the same period.

The New Orleans yard handled the greatest variety in ships. Out of 2182 vessels which were put back into service from this ship repair plant there were 183 tankers, 73 troopships, 478 cargo vessels, 40 combination cargo and passenger vessels, 167 barges, 20 ferries, 19 dredges, 3 corvettes, 14 destroyers, 3 destroyer tenders, 14 destroyer escorts, 2 gunboats, 10 submarines, 21 mine planters, 2 mine tenders, 70 cutters, 156 tugs, 1 trawler, 90 patrol boats, 44 mine sweepers, 53 sub-chasers, 4 retrievers, 236 LST's, 211 LCT8's, 1 net tender, 6 water tankers, 2 frigates, 14 whalers, 67 river towboats, 2 derrick vessels and 16 miscellaneous craft.

Of 522 new vessels built by the corporation since Pearl Harbor, 380 were constructed in 1943, and the record of new ship construction is expanding steadily.

A Navy seaplane tender is launched at the Los Angeles Shipbuilding and Drydock Corporation, San Pedro, California.

Mrs. Knefler McGinnis christens the U. S. S. Pine Island, first ship to be launched since Todd recently became managing agent of the Navy-Department-operated plant of the Los Angeles Shipbuilding and Drydock Corporation at San Pedro.



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California

AUXILIARY GENERATING SETS

INSTALLATION

The successful operation of the set depends upon accurate alignment. Since the base furnished with the unit is not of sufficient rigidity to insure maintenance of factory alignment during shipment, it is necessary to check the alignment when the set is being installed. This is done as follows:

(1) Place the set on the foundation with chocks between the base and the seating at each foundation bolt, making sure that the chocks are so adjusted that each is carrying a portion of the load.

(2) Draw down the foundation bolts sufficiently tight to prevent base from shifting.

(3) Remove the thrust bearing cover, the thrust bearing, and the upper half gear casing.

(4) Clean the slushing compound from exposed parts, including the pinion and gear, with kerosene, and wipe with a clean cloth. Do not use waste, as small threads may adhere to the surfaces and find their way into the oil passages.

The slushing compound is readily miscible in lubricating oil; however, its removal from exposed parts is advised, since it will have a tendency to hold dirt and lint which might fall on it while the upper half gear casing is off.

(5) Check the tooth contact between the pinion and gear by inserting feelers between the teeth at each end of the helix. The measurements should be the same within .0005 inches. When making these checks, shafts should be clamped down so that journals will rest in the bottom of the bearings.

If the measurements are not equal within the tolerance allowed, the necessary chocks must be adjusted to correct this alignment.

(6) Draw down foundation bolts tight and recheck contact. Adjust chocks again if necessary.

This check determines the final alignment and setting of the gear casing. Care should be exercised that this alignment is not disturbed in making the remaining checks and adjustments.

(7) Check the alignment of the turbine with respect to the gear, as follows:

(a) Check that the turbine and pinion shafts are running true. To do this, remove the generator end pinion bearing lining No. 3 and place an indicator against the side of the journal. Rotating the pinion and gear independently so that there will be no load on the teeth, take readings at eight or more points on the circumference while the pinion is rotated one revolution. The allowable runout is .0005 inches. If the runout is greater than this, the cause must be determined and corrected before proceeding further.

(b) Check that the outboard turbine bearing and the pinion bearings are in the same vertical plane. To do this, measure the distance between the sides of the generator-end pinion journal and the bore of the bearing seat. The journal must be central with the bore in a horizontal plane. It is obvious that this check must be made with the generator-end pinion bearing lining removed.

(c) Check the alignment of the outboard turbine bearing with respect to the pinion bearings in a vertical plane. To do this, measure the drop in the pinion shaft at the generator-end pinion journal, resulting from the removal of the bearing lining at that point. This drop should be .002 in. If the check shows improper alignment, change such shims as will either raise or lower the outboard end of the turbine journal to the required position. This alignment must be correct to assure proper loading of the turbine rotor and pinion bearings. In making this check, make sure that the clearance in the teeth is on the under side so that the teeth will not interfere with the dropping of the shaft.

(8) Reassemble the pinion bearing No. 3.

(9) Remove the turbine-end gear bearing cap and the worm on the gear shaft.

(10) Check the alignment of the generator with respect to the gear. This will necessitate three individual checks as follows (numbers refer to Fig. 1):

(a) Check that the gear and generator shafts are running true. To do this, remove the turbine-end gear bearing lining No. 4 and the bearing lining between the a-c generator and d-c exciter No. 6. When removing bearing No. 6 make sure that the generator rotors do not rest in the generator stators, as the deflection is considerable at this point with No. 6 bearing removed. Rotating the pinion and gear independently so that there will be no load on the teeth, take readings at eight or more points on the circumference of these two journals while the shaft is rotated one revolution. The allowable runout is .0005 inches. If the runout is greater than this, the cause must be determined and corrected before proceeding further.

(b) Check that the two generator bearings No. 6 and No. 7 are in the same vertical plane as the two gear bearings No. 4 and No. 5. To do this remove bearings No. 4 and No. 6. Measure the distance between the sides of these two journals and their corresponding bearing seats. Journals must be central with their bores in a horizontal plane.

(c) Check the alignment of the two generator bearings No. 6 and No. 7 with respect to the gear bearings No. 4 and No. 5 in a vertical plane. This will necessitate several independent checks as follows:

(1) With No. 6 bearing removed, measure the drop of No. 4 journal when the bearing lining at that point is removed. This drop should be between .0005 and .001

inches. If this condition does not exist, the shims under No. 7 bearing should be adjusted to raise or lower that bearing until the drop comes within these limits.

(2) With all other bearings installed, again measure the drop of No. 4 journal when the bearing lining at that point is removed. This drop should be between .004 and .010 inches. If this condition does not exist, the shims under the No. 6 bearing should be changed to raise or lower that bearing until the drop is within the above limits.

(3) Check drop of No. 5 journal with other bearings installed. Expected drop 1.5 to 3 times No. 4 journal drop.

(4) Check drop of No. 6 journal with other bearings installed. This drop should be .015 in. or more.

(11) Repeat checks from step 5 through step 10 to see that none of the alignment settings previously made have been disturbed by later adjustments. In repeating step 5 it is recommended that the tooth contact be checked. This can readily be done by applying Prussian blue to several gear teeth, red lead to several pinon teeth, and turning the rotors over by rotating the pinion in a clockwise direction, looking at the complete unit from the turbine end. The contact marking should be at least 90 per cent.

(12) Shim generator frames to obtain equal air gaps.

It is to be noted at this point that the turbine bearings and the exciter bearings are raised above that necessary to bring the shafts into a straight horizontal line. This is done in order that each bearing may carry its proper share of the load. The load reactions on all bearings will be equalized when the results of the above checks are within the limits specified.

While the above procedure is primarily for the initial installation of the equipment, it is recommended that these same checks be repeated if at any time there is any reason to believe that the alignmnt of the unit is incorrect. Slight corrections in the line-up may be made by adding or removing shims under the turbine or generator pedestals, providing tooth contact of the pinion and gear is within the limits specified.

Operation of Turbine

Before starting, see that all the adjustments are checked and that all the requirements called for in the instructions for the various units are carried out. See that all bolts are properly tightened.

Preparation

Conduct the operations according to the following sequence:

(1) The oil tank must be filled to the proper level, the full capacity being 65 gallons. Use the recommended grade of oil.

(2) Apply oil to all of the bearings of the rods and levers of the governor mechanism and valve-gear connections.

(3) If the turbine is to operate non-condensing on a closed exhaust system, see that the piping does not contain water. See that the exhaust drains are open and that the relief valve will operate.

(4) If the turbine is to operate condensing, start the air pumps and the circulating water if a surface condenser is used, or the jet in the case of a jet condenser.

(5) Open the drain ahead of the throttle valve so as to drain all condensate from the main when the stop valve is opened.

(6) Open the stop valve ahead of the throttle valve slowly so as to warm the piping gradually and drain away the condensate.

(7) See that all drain valves leading from the packing boxes and the turbine casing are open.

(8) See that the emergency valve is latched in the valve-open position.

(9) See that the steam supply is dry and remains dry during starting, keeping the drain for the steam supply pipe open only as required for this purpose.

Starting

(10) Pump oil to the bearings by means of the hand oil pump, and also lift the controlling valves by means of this pump: then open the throttle valve sufficiently to start the turbine revolving; trip it immediately by hand to see that the tripping mechanism operates properly and to prevent the machine from accelerating too rapidly.

(11) Immediately open the throttle valve again to keep the turbine shaft revolving slowly, and at the same time admit steam to the packings, closing the packing drains after the condensate has been discharged. Do not admit steam to the packing unless the shaft is rotating. If at rest, the shaft may be warped enough by the heating of one side to throw the rotor out of balance.

(12) Inspect all oil-fed valves and the complete oiling system, making sure that all parts are working properly. Should any rubbing, unusual noise, or vibration be detected, stop the turbine immediately, as this may indicate lack of clearance. Under no circumstances continue the operation of the machine until after the cause of unusual noise has been investigated and corrections made. If there are any signs of rubbing, the rotating element may be shifted. See the section on **Maintenance.**

(13) Check the vacuum to see that the condenser is operating properly.

(14) Slowly bring the turbine up to half speed. Keep the turbine at that speed and let it warm up for about 15 to 30 minutes (when starting the first time). See that there is no indication of rubbing of the shaft packing or rotor.

(15) Regulate the oil valve for the bearings so that the gages will indicate the pressure needed to maintain the proper oil flow.

(16) When the temperature of the oil leaving the bearings reaches 100 F. start the circulation of water in the oil cooler, regulating the flow of cooling water to suit conditions and to prevent chilling the bearings.

(17) When the turbine is warmed sufficiently, and satisfactory operation is obtained, gradually increase the speed as conditions permit.

The governor should start to operate from 1.5 per cent to 3 per cent below normal speed, and should close the controlling valves one by one until the no-load speed is reached.

(18) When normal speed is reached and the machine is under the control of the operating governor, apply the load.

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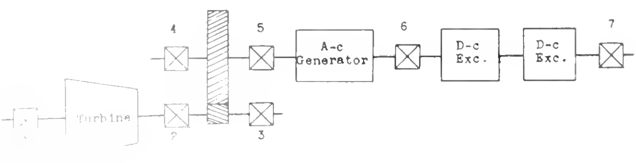
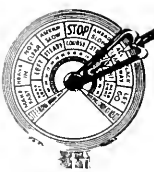


Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

NEW SPECIMEN EXAMINATIONS FOR LICENSED OFFICERS

(Continued from March issue)

Subject: INTERNATIONAL AND INLAND RULES OF THE ROAD

This subject, under the caption "Third Mate—Ocean" is common to all grades of the masters' and mates' examinations and all candidates will be expected to have a thorough grounding in this important subject.

Time allowed 3 hours.

Subject: SIGNALING AND SIGNALS

This subject, under the caption "Third Mate Ocean," is common to all grades of the masters' and mates' examination and all candidates will be expected to have a thorough grounding in this important subject. It includes: Signaling by International Code flags, Morse, and semaphore; signals used by the U. S. Coast Guard in livesaving; distress, Storm, and special signals.

Time allowed—3 hours.

Subject: STOWAGE

1. If you are given two derricks and two winches at each hatch, how would you rig the derricks in order to load general cargo?

2. Describe how you would rig a jumbo boom to load [illegible] a locomotive in No. 2 hold?

3. When loading [illegible] a cargo, what precautions [illegible] sider necessary?

4. What would you [illegible] before signing cargo recei[illegible]

5. Would you sign a receipt stating the weight of cargo?

6. You are kept on demurrage abroad; what would you do when you got your bill of lading back?

7. How would you expect a ship to behave at sea if more weighty cargo were loaded in the extreme ends of the ship?

8. Suppose you are in a tanker loading a full load of gasoline. You are bound through the tropics. What precautions would you observe with respect to loss of gasoline through expansion?

9. Describe the carriage of oil on a tanker in detail.

10. Your ship is 10,600 tons deadweight, 740 tons of fuel and stores are already aboard, and the cargo holds have a total capacity of 591,600 cubic feet. You are informed that two cargoes are to be loaded, a measurement cargo of paper rolls with a stowage factor of 80 and a deadweight cargo of drums of paint with a stowage factor of 20. How much of each can you take and still have your ship full and down?

Time allowed—2 hours.

Subject: CHANGE IN DRAFT

1. What log book entries are required to be made relative to the draft of the vessel and the load line readings?

2. How do you ascertain the density of the water at the dock where the ship is loading?

3. The fresh water allowance being 6 inches for a vessel, how much may she submerge her marks when loading in water of density 1,010 ounces?

4. A vessel draws 25 feet 00 inches in sea water. What will be her draft at a dock where the specific gravity of the water is 1,010 ounces?

5. A vessel loads a full cargo, in a dock where the hydrometer floats at 12. To what draft will she have to be loaded so as to draw 23 feet 6 inches when she gets to sea?

Time allowed—1½ hours.

Subject: SEAMANSHIP

1. What are the advantages of doubling the purchase on a cargo fall when handling heavy weights?

2. In handling cargo with the common cargo boom and hoisting rig, what part of the gear is subjected to the greatest stress?

3. A derrick 32 feet long plumbs a point 24.5 feet from the mast. The span is made fast 25 feet above the heel, load of 12 tons being lifted with a gun tackle purchase. Find the tension on the span and the thrust on the derrick, allowing 10 per cent for friction. The hauling part is led to a winch at the heel of the derrick.

4. If you had been a considerable time at sea and found that your vessel had become tender, to what would you attribute the cause and how could you remedy it?

5. The I. T. M. being 1,100 foot-tons and the T. P. I. 45 (a) at which distance abaft the tipping center must a weight be loaded so that the forward draft will not change? (b) How many tons are required to be loaded at that point to increase the draft 10 inches aft?

6. Describe and sketch the load line markings and their purpose. What is your duty regarding them?

7. When it has not been possible to range out the anchor chain for an extended period, what maintenance care would you give it?

8. How would you run a 6-inch line between a ship at anchor and a buoy two hundred yards to tideward of the ship?

9. When riding at anchor to a weather tide with the tide slackening, what would you do with a heavy squall coming up from astern?

10. Coming up a narrow river on the flood tide, how would you turn her around?

11. You are left in charge of a vessel at night alongside of a dock in New York harbor and you dis-

cover that a serious fire has started on your vessel. Explain in detail what you would do?

12. Where and how should the gross and net tons and official number of a vessel be marked?

13. Describe the transverse method of ship construction.

14. Is the ship's plating all the same thickness?

15. What is power tonnage?

Time allowed—2 hours.

Subject: TEMPORARY REPAIRS TO HULL AND EQUIPMENT

1. What would you do if a wire cable became fouled in the propeller while backing out of a slip?

2. How would you get your anchor up if the windlass was broken down?

3. Explain construction of a drag and its use.

4. You have lost your propeller, in a light ship, how would you ship the spare one in an open roadstead or at sea?

5. After abandoning ship you discover several bullet holes in your lifeboat. Explain how you would repair the damage.

Time allowed 1 hour.

Subject: LIFE SAVING APPARATUS

1. What equipment, including emergency equipment, is required on life rafts on ocean vessels?

2. How are lifeboat falls to be protected?

3. How is buoyant apparatus required to be stowed?

4. Describe the construction of life preservers and state how many are required and how they are tested.

5. What is the requirement regarding opening and closing of watertight doors?

6. Describe the wire cable, traveler, and endless whip and state where this equipment is required to be carried.

7. Describe the line - carrying (Lyle) gun and its required equipment. Describe how you would drill the crew in its use.

8. Name the equipment that the crew shall be exercised in during drills.

9. How often are fire and boat drills to be held and how are they to be conducted?

10. How is the life preserver light, when worn by a man in the water, distinguished from the lights on rafts and floats?

Time allowed—2 hours.

Subject: SANITATION, RULES AND REGULATIONS AND NAVIGATION LAWS

1. Describe in detail how you would fumigate your ship if in a port where fumigation service was not available.

2. What cargo is prohibited by law on passenger vessels?

3. How would you satisfy yourself that all lifesaving equipment is in good order, in place and ready for use?

4 May a vessel whose certificate of inspection has expired be issued a permit to allow it to carry passengers while en route to another port for repairs?

5. What is the law regarding cabin watchmen on passenger vessels?

6. What is the law regarding officers and crew frequenting passengers' quarters and the penalty for its violation?

7. What extra steering apparatus is required on all steamers? When and how would you test it?

8. What persons are excluded from the navigating bridge while a vessel is under way?

9. Describe the combination smoke detecting and CO_2 fire extinguishing system and explain where it is installed and how it functions.

10. What is the Oil Pollution Act and the penalty for its violation?

Time allowed—2 hours.

Subject: GENERAL

1. What are the most important things for the first officer of a vessel to look after when the vessel is loaded and about to leave port?

2. Suppose you had to jettison a portion of your cargo of oil. How can it be started with least possible delay?

3. If your ship were on fire and large quantities of water were being pumped into the holds, what precautions would you take to maintain [illegible] of your vessel?

4. Should a steamer heel easily when being winded, what would this fact denote?

5. What would you do if your steering gear broke down in crowded waters?

6. When entering or leaving port, what does good seamanship dictate with regard to anchors?

7. Before crossing a bar, what preparations would you make insofar as the safety of your own vessel and crew is concerned?

8. What has been your experience in using oil to smooth the waves and where can you obtain information regarding its use for this purpose?

9. You are docking a light, single screw vessel, starboard side to the dock. Where would you place one towboat for most effective use?

10. What is a breeches buoy?

11. What have you to be careful about when making fast alongside where there is a big rise and fall of tide?

12. About how much water should be run into compartments of tank vessels for the testing of bottom rivets and seams?

13. What is the difference between anticorrosive, antifouling, and boottopping compositions? State why each is used and where.

14. In discharging a locomotive with ship's gear, when is the most dangerous moment during handling?

15. Describe any modern method, with which you are familiar, of mechanical ventilation and air conditioning of cargo holds.

16. Describe any modern mechanical arrangement for handling metal hatches with which you are familiar.

17. If the captain died at sea—the mate possessing a mate's license only, what should he do?

18. (a) What is a contract of affreightment and what is a charter party? (b) what implied warranty is there in both?

19. If any cargo is carried on deck without the consent of the shipper or without being shown by the Bill of Lading as being "on deck," will the vessel be rendered liable for loss or damage sustained thereby from an excepted peril?

20. Where should lookout stations aboard ship be situated during the present emergency?

Time allowed—3 hours.

Pacific Coast Marine Activities

By Special Correspondents

Capt. W. H. Munter, U. S. Coast Guard, District C. G. officer, Seattle, who retires on April 1 after 44 years' service.

C. G. Veteran Retires

Capt. William H. Munter, district Coast Guard officer, Seattle, who retired on April 1, was guest of honor on March 8 at a banquet attended by 175 officers of this Government service. Captain Munter is completing nearly 45 years in the Coast Guard. He will be retired with the rank of rear admiral.

Lieut. Comdr. Ben C. Wilcox, a veteran of 30 years in the Coast Guard, was master of ceremonies, and introduced the speakers.

Captain Munter will be succeeded as district Coast Guard officer in Seattle by Capt. F. A. Zeusler, district Coast Guard officer at Ketchikan, Alaska.

Intercoastal Trade Survey

The Intercoastal Steamship Freight Association plans an early survey among the numerous shippers throughout the nation to assemble complete data on possible post-war intercoastal shipping requirements. These data are to be assembled for submission to the United States Maritime Commission to enable them to determine as exactly as possible the number of the fast new freighters to be allotted to this service immediately following the termination of the war.

This survey is to include complete tonnage details, all points of origin, destinations, loading and discharge ports, and full information as to freight handling, port and storage facilities. The full cooperation of all port authorities is being asked.

Fish Storage Plant for San Diego

A syndicate composed of Salvatore Pisciotta, A. Giacalone, Joe Filimini and Jack Buono has filed application for a long-term lease on the old pier located two blocks east of the San Diego terminal of the Coronado ferry for use as a cold storage plant for the storage and processing of fish.

It proposes to rebuild and lengthen the pier and erect a modern cold storage plant. The syndicate has advised the Harbor Commission that it has cleared the priorities on the obtaining of the necessary machinery, equipment and materials, and is prepared to proceed with immediate construction. The Harbor Commission has asked that complete plans, specifications and evidence of its ability to obtain prorities and complete the plant be submitted for its approval.

The proposed new plant will be located at the north end of the new commercial pier area and convenient to vessels taking reefer cargoes.

Pribilof Islanders To Be Returned

Natives of the Pribilof Islands of Bering Sea, who were evacuated early in the war, will be returned to their former homes, the United States Fish and Wildlife Service in Seattle announces. Arrangements for re-establishing the native population on St. Paul and St. George Islands are being made. The natives were moved to Funter Bay, Alaska, for military reasons.

Plans for the Pribilofs, famous fur seal islands, for 1944 include the construction of a large addition to the by-products plant on St. Paul Island. Because of the importance of the work in this part of Alaska this year, Clarence L. Olson, who has had long experience in the administration of Alaska fisheries, has been assigned to the Fur Seal Administration of the Fish and Wildlife Service as assistant chief. Edward C. Johnson will continue to direct the fur seal work.

Smith Cove Expansion

In another big development in the Seattle area, the Navy will spend $4,220,000 for expansion of facilities at Smith Cove, it is announced.

The project includes the acquisition of land and the building of barracks for 5000 enlisted personnel, bachelor quarters for 80 officers, an officers' subsistance building and bakery, a recreation hall, auditorium, dispensary, storage building, laundry, gun shed and other structures.

Pacific C. and F. Co. Buys Everett-Pacific Co.

Announcement has been made that the Pacific Car and Foundry Company, Renton, Wash., had acquired all of the stock of the Everett-

Pacific Company, a shipbuilding firm engaged in the construction of floating docks and auxiliary naval vessels at Everett.

At an Everett-Pacific Company stockholders' meeting held recently it was announced that Ferdinand Schmitz, Jr., had been elected president; Paul Pigott, vice president and treasurer; and Jack Browne, secretary. The Everett yard is expected soon to undertake the repair and conversion of marine vessels of all types of any size up to 12,000 tons for the War Shipping Administration and private operators. The repair yard which has been constructed at the Everett-Pacific Company yard by the United States Navy for the repair of naval vessels should be completed and ready for operation within the next 60 days.

The Everett-Pacific Company was one of five companies given contracts for the construction of battleship sectional docks in 1942, and was the first company to complete and have accepted its sections for the first operating unit. It will be also the first company of the five to complete the first section of its cruiser dock contracts.

Alaska Salmon Fisheries

Men and supplies for the 1944 Alaska salmon season are beginning to move from Seattle. This year 89 canneries in Alaska will operate, compared with 77 last year. There are 119 canneries in Alaska, which normally produce 90 per cent of the United States supply of canned salmon. This is the second year of concentrating the canning of salmon in the most efficient plants, to make the best of scarce materials, equipment and man power, most of which must be imported by Alaska from the United States. The order specifies the man power quota for each plant as established by the War Manpower Commission. It requires that all persons and companies authorized to engage in salmon canning must obtain a license from the Fishery Coordination Office. The licenses, however, will be issued automatically to all canners named in the order. The industry was unanimous in requesting that the 1943 concentration plan be repeated this year.

The program will be administered from Seattle by Ralph A. Ferrandini, Alaska area coordinator of the Office of the Coordinator of Fisheries. Captain J. Steele Culbertson, on liaison assignment from the Army to the Office of the Coordinator of Fisheries, will be in charge of field operations in Alaska, making his headquarters in Juneau.

Seamen on the Beach

Officials of Seattle's maritime unions declare that approximately 500 unemployed seamen are "on the beach" as a result of the changeover from Liberty to Victory ships and the laying up of Liberty ships for structural changes.

E. T. Joste, port representative of the Recruitment and Manning Organization of the War Shipping Administration, said that the condition on the Seattle waterfront should clear up in 60 days.

Manuel Diez, patrolman for the Marine Cooks and Stewards' Association in Seattle, said his union had about 200 men who had been waiting a month or more for a ship.

E. L. Coester, agent for the Sailors' Union of the Pacific, reported an average of 125 men idle in Seattle during the past month.

A number of ships have been laid up due to the Truman committee's findings. Naturally that throws a lot of men out of jobs. It makes it tough on the young fellows who are experienced, but still of draft age. They have to report to the Recruitment and Manning Organization and get an extension of their shore time. A man is only supposed to get two days ashore for every week spent at sea. Draft-age seamen cannot exceed 30 days on the beach.

Shipping Terminal Near Completion

J. A. Earley, president of the Port of Seattle Commission, announces that Seattle's new $3,000,000 shipping terminal will be completed and turned over to the Army in April. The terminal will be a double pier 1000 feet long and 400 feet wide, with two transit sheds each 980 by 120 feet. There will be depressed railway tracks between the sheds and open aprons on the sides. The terminal will be the largest in Seattle except for those at Smith Cove.

Mr. Earley told of other port improvements — the construction of three additional mooring piers, each 300 feet long and 20 feet wide, at the Port of Seattle, Salmon Bay Terminal. The new piers will be of saw-tooth design and will provide mooring space for 80 additional fishing vessels, three to a berth.

Welded Steel Car-Ferry Barge

Shipyards in the Pacific Northwest have been much interested in the first all-steel, all-welded railway car-ferry barge placed in service between Seattle and the Bremerton area by the Puget Sound Navigation Company. The vessel was built by the Reliable Welding Company in Olympia, Wash.

H. C. Hanson, Seattle naval architect, who designed the new ferry, says that the 264-foot vessel will save 30 per cent of the operating costs and 25 to 30 per cent towing time, compared with a wooden barge of her size.

The new vessel draws only 22 inches of water when light, about half as much as a wooden barge of the same size, and consequently has less resistance in the water. The new ferry has 17 watertight compartments and is virtually unsinkable. She is equipped with four skegs to prevent veering and to help her hold her course, and has three railway tracks with capacity for a 15-car train.

This all-steel, all-welded railway car-ferry was built in the plant of the Reliable Welding Company, Olymaia, Washington, for the Puget Sound Navigation Company. It is shown here ready for launching. The ferry is the first of this construction in service between Seattle and the Bremerton Area, and is serving naval districts on Puget Sound.

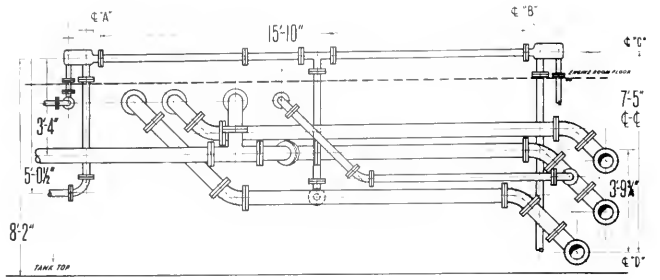


Fig. 1

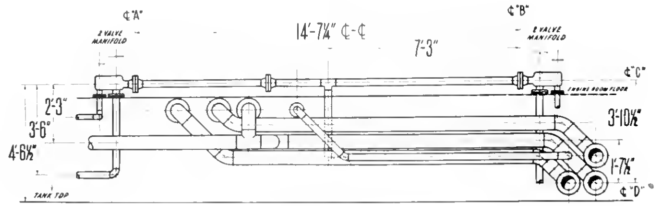


Fig. 2

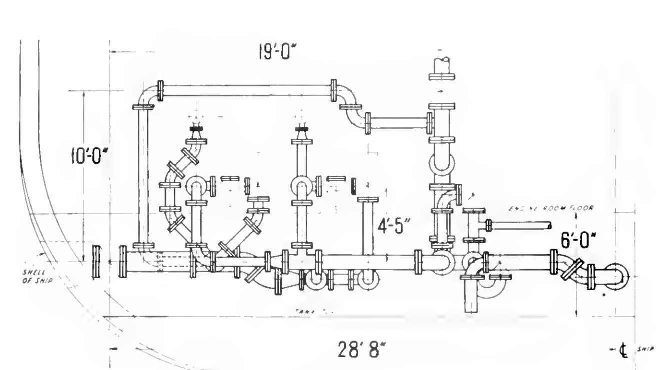


Fig. 3

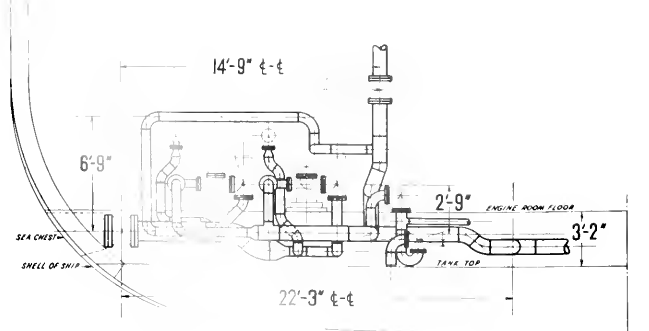


Fig. 4

Welding-Reduce

Fig. 1: Section of the fuel oil suction and transfer piping system of a Liberty ship, in which cast fittings and flanges bring the total weight up to 7884 pounds.

Fig. 2: The same section of piping in the same ship as shown in Fig. 1. Here the substitution of Tube Turn welding-fittings reduces the weight of the section to 2870 pounds, a saving of 2½ tons of critical metal.

The piping systems of a modern vessel represent nearly one-tenth of the cost of the vessel, both in labor and in material. Through these arteries flow fuel, water, air, lubricants and steam, the very life-blood of the ship. Deprived of them no ship could move.

Packed beneath the decks of the average naval vessel today is something like 50 miles of piping—steel, wrought iron, copper, brass and lead—ranging in weight and in size from ⅛-inch tubing to 16-inch pipe. Official figures released at the time of her launching in December show that the battleship Wisconsin contains 80 miles of piping, enough to supply water, gas and sewers for a small city.

The demands of war have taught designers and shipbuilders how to assemble these systems in less time, and how to make them stronger, lighter, more compact, and easier to maintain. The welder and welding-fittings have almost revolutionized the planning and installing of marine piping systems.

Welding-fitting installations are made quicker and insure greater strength and safety in less space and with less weight. Space saved and weight eliminated mean additional space for extra pounds of valuable cargo.

Fig. 3: A section of the fire main and salt water lines on an escort type aircraft carrier, showing cast steel flanged construction. Total weight of the assembly, less valves and pumps, is 18,915 pounds.

Fig. 4: Same section of piping in the same vessel, showing the substitution of Tube Turn welding-fitting construction. The weight is reduced to 3477 pounds, a saving of 15,438 pounds—nearly eight tons of critical metal.

Fittings Bulk and Weight

by T. H. Pike, Jr., as told to Orval C. Husted

The average modern vessel has at least 20 major piping systems, including heating, air testing, refrigerating, cooling, flooding, pumping, fire, sanitation, fuel, fluid cargo, lubrication oil, hot and cold fresh water, salt water, steam, and electricity.

Making the installation problem still more complicated, the pressures in many of these systems have shot upward in recent years. Where most lines had to withstand only a nominal pressure a few years back, some specifications now call for steam installations to withstand 650 psi (and in a few extreme cases 1200 psi) at temperature levels as high as 850 degrees. This calls for thicker, heavier pipe, and also means that even the smallest leak will present an expensive maintenance problem. New flash type boilers, for example, operate with tubes at cherry-red temperatures. All marine uses require piping and fittings that are entirely dependable.

Every foot of piping in a vessel is subject to its share of the strain caused by the rolling and tossing of the ship and the vibration of the engines.

Welding-Fittings

Long before Pearl Harbor, Tube Turns of Louisville, Kentucky, was pioneering the field of improvement in marine piping practices by compiling and publishing comparative data and drawings on sections of various piping systems showing the advantages of welding-fittings over cast fittings and flanged constructions.

Results of these studies show that the time needed to install sections of piping was frequently reduced as much as 50 per cent when welding fittings were used. Large welded sections can be preassembled in the pipe shop and be air-tested before being installed in the ship. Then when they are lifted into place in the crowded hold only a short time is required for a few men to weld them into place or slip in the gaskets and bolt the flanges together.

In a single section of the salt water circulating system on the CB-1 cargo vessel a shift to welding-fittings reduces the weight by 5359 pounds. Exclusive of valves and pumps, the section with cast steel flanged construction weighs 7020 pounds. With welding-fittings it weighs 1661 pounds—nearly three tons lighter.

Other points about which engineers are happy are the facts that this welding-fitting construction is actually two feet shorter and two and one-half feet narrower, and can be

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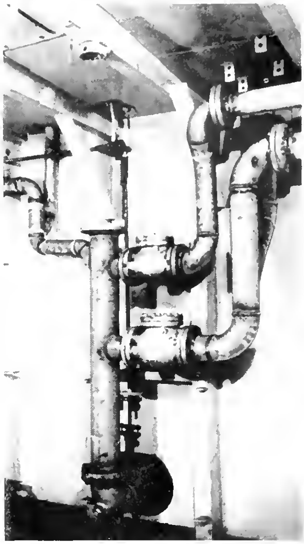
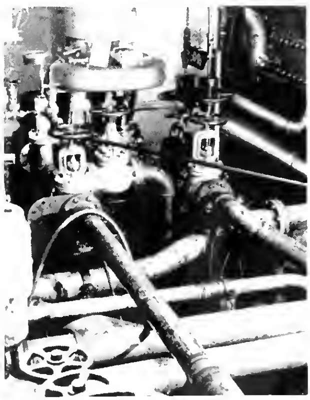


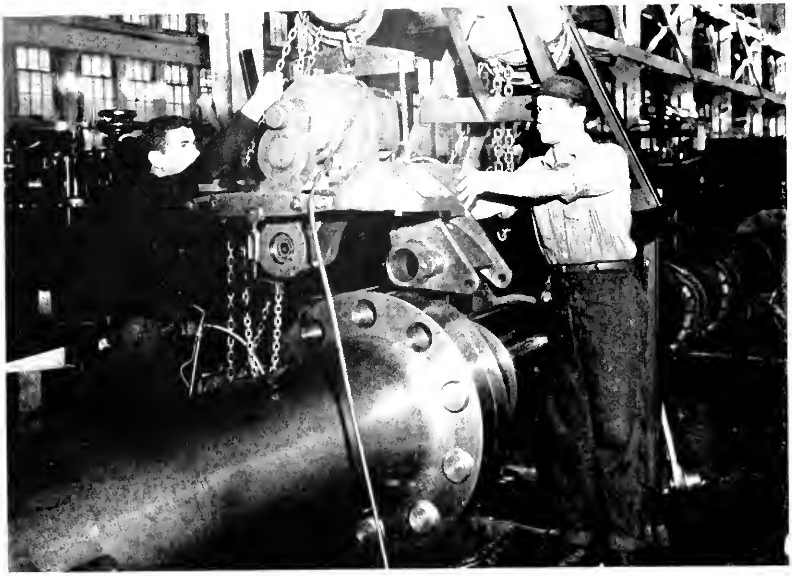
A preassembled unit of marine piping containing a couple of dozen welded joints made with Tube Turn fittings.



Right: Section of fuel oil transfer system in a C-3 cargo and passenger steamer. Tube Turns are used throughout the ship on the ballast system, bilge system and fuel oil transfer system.

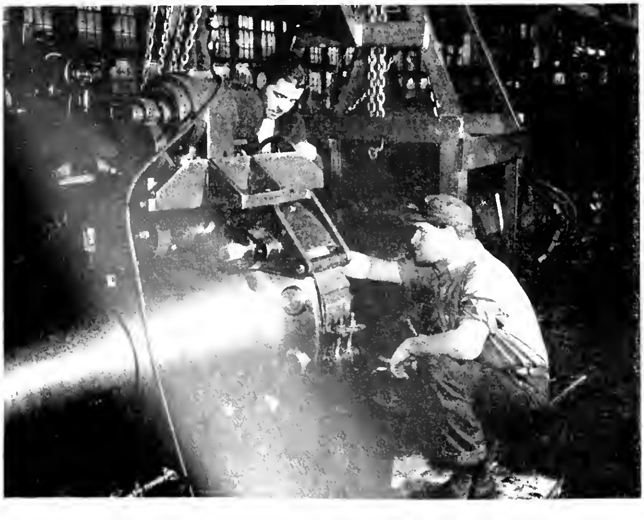
Below: Typical maze of pipes in a Liberty ship, with nearly a score of welding-fittings visible.

Mr. Pike is West Coast manager of Tube Turns.



Placing line reamer on drive shaft for C-3 to taper reams connecting bolt holes in flanges.

Reaming Line Shaft Flanges



Line reamer in operation.

A lengthy job, difficult to do accurately, is the line reaming of tapered holes through line shaft flanges under ordinary conditions and with standard tools and methods. A short cut to this job, which both saves time and offers the maximum of accuracy, has been developed and patent applied for by the Tool Engineering Division of Joshua Hendy Iron Works.

This division, headed by George Bowman, chief tool engineer, has designed, built and put into successful operation a portable machine tool which line reams tapered holes through line shaft flanges to tolerances of .001" or less for fitted bolts.

The Hendy portable line reamer not only gives assurance of perfect alignment and shortens time required for the job, but also because of the portability of the machine enables line reaming to be done in a shipyard or in the shaft alley of the vessel.

The assembly has three basic parts: (1) four cast iron cradles or pedestals to line up separate shafts, if required; (2) reaming unit, a frame holding reamer and standing shaft; (3) a set of reaming bits.

The machine is mounted on the flange of the line shaft coupling and

is aligned with the hole that has been rough drilled to a predetermined size by inserting a plug in the hole next to the one to be reamed.

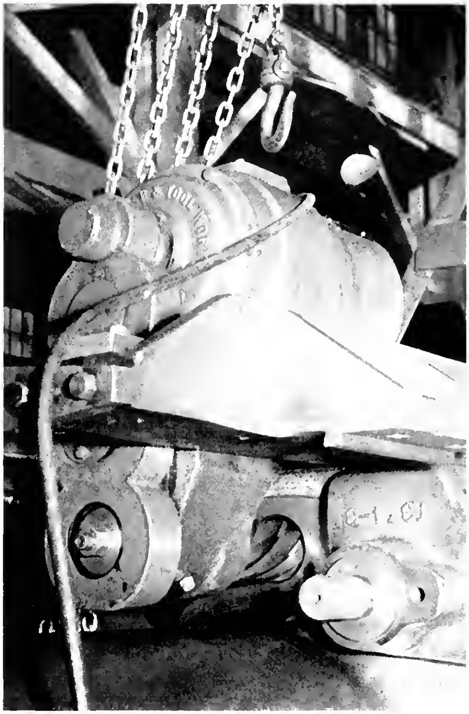
Excess stock is removed from rough drilled holes by means of a "porcupine tool." This latter is a solid body with a series of 17 cutters spaced spirally around it. This roughs out stock to within about 1/16" nominal size. The roughing reamer is then inserted and removes stock to within .010" or .012". After this the sizing reamer completes the hole. The shaft is then rotated and the machine indexed to position for the second hole. This operation is repeated and the bolts inserted until the entire flange is reamed.

The cradles or pedestals are designed with leveling screws for elevating and adjusting screws for lining up the separate shafts, and each cradle is equipped with cast rollers for revolving the shafts. The reaming unit is handled by a crane or chain hoist and is lowered onto the joined flanges of the shafts and rigidly fastened in place. The gear reducer drive and feed are mounted on the cast iron frame of the reaming unit. The reamers are quickly installed and removed. The holes for the locating pin are in the cast iron frame. After reaming each hole the unit is loosened, hoisted above shaft, and shaft rotated and the unit then lowered, located in the proper position, and fastened in place for the next reaming operation.

The reamer is driven by a $1\frac{1}{2}$-hp electric motor with a reduction unit.

The semi-finish reamer is designed with seven flutes. The finish reamer bit has eleven flutes, designed so that each flute has an advance of one or two degrees. This unequal spacing avoids the chatter which exists in reamers with evenly spaced flutes.

These reamers are manufactured with special saddles and reamers for each job. Units are in operation now at Joshua Hendy's plant at Sunnyvale; at California Shipbuilding Corporation, Terminal Island; and at Marinship in Marin County.



Close-up showing detail of reamer in flange hole ready to operate. Locating plug is shown in position.

Reaming bits. Left to right are: Finish reamer for removing last few thousandths of stock; semi-finish reamer; porcupine roughing reamer; locating pin; taper plug gage.

Improvements In Gun Mount Separators

by S. R. Thomas

The Bantam Bearings Division of The Torrington Company was called upon by the Navy Department to investigate the matter of gun mount bearing separators, as this Division was manufacturing several types of bearings for Navy guns, and it was only natural that familiarity with the subject be put to use.

At first the separators were made of bronze, the main constituents of which are copper and tin, two critical materials. This bronze is cast into approximately the desired shape, and subsequently machined to exact shape. Castings had considerable bulk and weight in order to provide the necessary sections for strength.

Certain metals became extremely critical, especially in the non-ferrous group. Their substitution was made a study by all concerned.

Manufacturing man-hours was becoming more and more a problem, and its solution lay in designing parts to be made faster and easier.

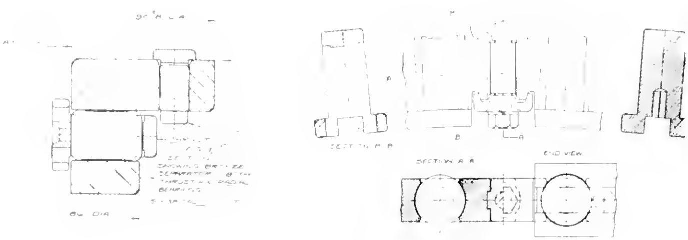
Transportation facilities quickly became a matter of vital importance, and any saving in either weight or bulk was worthy of every effort.

Cost, although not an item of primary importance, was still to be considered. Generally a reduction in weight, use of a cheaper material and a saving in man-hours result in a saving in cost.

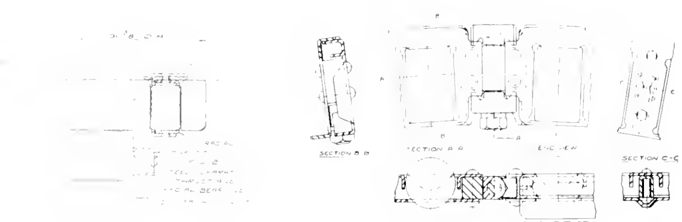
Work was started in designing a light pressed steel cage for the 5"/38-caliber single gun mount thrust bearing. It soon became apparent that the same principle of design could be extended to other mounts. This principle was next applied to the 3"/50-caliber gun mount in both the thrust and also the clip bearing. After several conferences with the Navy Design Section, during which sketches and drawings were submitted and discussed, a contract for the stamped steel pilot mount separators was placed. These were built and tested in their respective mounts by the Navy, and were approved, with minor changes in the case of the 5"/38 thrust bearing and with no changes in either of the 3"/50 bearings.

The item of primary importance at

The author is chief engineer, Bantam Bearings Division, The Torrington Company.



BRONZE SEPARATOR 5"/38 CAL THRUST
FIG. 3



STEEL SEPARATOR 5"/38 CAL THRUST
FIG. 4

he start of this development was that certain fighting ships be faster, carry less weight, and at the same time be amply equipped with fire power. To accomplish this, study was made of all parts where there was a possibility of lessening weight without sacrificing the necessary requirements. The separators presented the only part of the bearings that could be lightened, as the race rings were already as light as was consistent with their duties.

The development of the 5"/38-caliber single gun mount was chosen, first, because of its wide use, and also because it happened to be the principal equipment of the particular type of ship under construction. The thrust cage offered the best chance to find out what could be done in the way of weight-saving. Figure 1 shows a diagrammatic sketch of the original assembly of both the thrust bearing and also the radial bearing with bronze separators. The sections of the thrust bearing, of which there are eight, are held together by clamps, as illustrated in the plan view, Fig. 3. Here, also, are shown several sections. Each roller pocket fully encloses the roller and the cage weight is carried on the rollers. The sections are made as such, to facilitate handling, as it will be noted the assembly is of large diameter, approximately 87".

The complete weight of the eight sections as cast is 224 lbs. The eight sections finished, plus the eight clamps to make one complete assembly, weight 176 lbs. Figure 2, a schematic diagram, illustrates both thrust and radial separators to the new design. Referring to Fig. 4, a sectional plan view is shown of the steel stamping development. Sections at various points are also shown to illustrate more clearly the construction. This thrust separator, complete with eight sections and clamp assemblies, weighs 54 lbs. Thus a weight saving was made in this one thrust separator of 122 lbs., or almost 70 per cent. It will be noted from Fig. 2 that the separator is not carried on the rollers, but rides on projecting shoes stamped into the lower plate, which contact the raceway. The effort to turn this separator with its rollers in place is considerably less than with the bronze separator. Thirteen-gage metal is used in both the top and bottom stampings of this separator, and an extremely stiff and rigid section results. The upper and lower halves are held together (Fig. 4, Section CC) by brass rivets, and inverted "U" shaped spacers separate them.

It will be further noted that no top projections are needed on this separator to prevent its "float," because the roller pocket perforations in the lower stamping are of less width than the diameter of the rollers. As the rollers are straight, they naturally tend to run tangent to the roll paths of the races; therefore flat contact surfaces are provided for the outer end as well as both sides of each roller. These are merely formed lips, as shown in Fig. 4. Before assembly of the halves of each section the parts are heavily zinc plated, thus circumventing the probability of any subsequent reaction of the electrolyte, had the riveted assembly been plated as a unit. Guiding of the steel cage is similar to that of the bronze type. It is kept concentric with the race rings by a vertical flange drawn downward from the lower stamping (see Section BB, Fig. 4).

Figures 5 and 6 show the 5"/38-caliber radial separator in bronze and pressed steel, respectively. This development followed the approval of the thrust separator, and is closely related in design to that of the latter. The rollers at assembly are kept from sliding completely through their pockets to the outside by the narrower perforations in the outer stamping. The bronze separator, Fig. 5, was made in four sections weighing 35½ lbs. each as cast, or 112 lbs. per bearing. As machined, this weight became 92 lbs. per bearing. The pressed steel assembly, Fig. 6, is made in eight sections of 4½ lbs. each, or 36 lbs. per bearing, a saving in weight of 56 lbs. or 16 per cent.

A summation of the weight saved in the several separators is shown in the table below.

Summation of Advantages

The critical materials of copper and zinc are, outside of the relatively few rivets, entirely replaced by sheet steel.

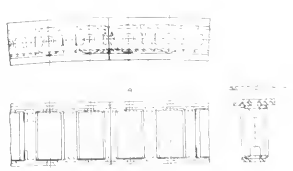
After completion of the dies, the saving in man-hours is enormous.

The transportation problem is greatly simplified. In place of each manufacturer of gun mount bearings producing his own individual separators of bronze with the bulk of necessary machinery required, it is possible for a stamping plant to turn out in a short time all the necessary separators for all the makers of these gun mount bearings. The stamping source now ships completed separators direct to the various prime contractors for assembly into gun mounts. Inspection is centralized at one plant, thus eliminating duplication.

The saving in cost by this development of the stamped steel retainer is a natural reflection of the combined savings in weight, critical materials, man-hours and transportation, and is an item of no mean amount.

The Bantam Bearings Division of The Torrington Company, in designing this type of separator, gives credit to help and suggestions made by the Navy, by The Miehle Printing Press Company of Chicago, Illinois, and to the Applied Arts Corporation of Grand Rapids, Michigan, whose suggestions for production of these stampings have been of great value. Besides steel stampings for the separators of the thrust and radial 5"/38-caliber bearings, the thrust and clip bearings of the 3"/50-caliber mounts, the bronze separators of the Bofors 40-mm twin mounts will soon be replaced with those of stamped steel.

BRONZE SEPARATOR 5"/38 CAL RADIAL
FIG 5



STEEL SEPARATOR 5"/38 CAL RADIAL
FIG 6

Table I

Gun Mount Bearing	Separator Bronze	Weight Steel	Weight Saved	% Weight Saved
Bofors 40 MM Single..........	6.72	1.25	5.47	81.4
5"/38 Thrust..........................	176	[illegible]	122	69.3
5"/38 Radial	92	[illegible]	[illegible]	60.09
3"/50 Thrust..........................	12	[illegible]	[illegible]	62.5
3"/50 Clip	[illegible]	[illegible]	[illegible]	56.1

On the Ways—
SHIPS IN THE MAKING

Perm-Metals Corp. Yards Topped U. S. Shipyard Deliveries for February

The West Coast has topped the American shipyards deliveries again! In fact, the Henry J. Kaiser organization achieved two triumphs in shipbuilding: the Permanente Metals Corp. yard in Richmond, California, produced 23 vessels during February, and Oregon Shipbuilding Corporation, Portland, delivered the first of the Victory-type vessels.

American shipyards delivered 134 vessels during February, including 77 Liberty ships and one of the faster Victory vessels, according to a report by the Maritime Commission. Despite seasonal decline in man power due to unfavorable weather conditions in most areas, and loss of construction time because of conversion, shipyards succeeded in delivering 10 more vessels and 167,134 more deadweight tons in February than in January.

West Coast shipyards delivered 57 vessels, or 42.9 per cent of the total production. East Coast yards produced 48 ships, or 38.5 per cent of the total tonnage. The Gulf Coast delivered 26 ships, or 18.4 per cent of that month's output. Great Lakes yards delivered 3 special type vessels representing 0.2 per cent of the total.

The number and types of vessels built by all the yards during February follow:

Shipyard	No. of Vessels	Type of Vessel
Alabama D. D. & S. B. Co.	3	Tankers
Bethlehem-Fairfield	15	EC-2 Cargo
Bethlehem, Sparrows Pt.	1	Special Tanker
	1	C-3 Cargo
California S. B. Corp.	11	EC-2 Cargo
Consolidated Steel Corp.	1	C-1 Cargo
	2	Special types
Delta S. B. Company, Inc.	2	Emergency Tankers
	2	EC-2 Cargo
East Coast Shipyards, Inc.	1	Coastal Tanker
Froemming Brothers	2	Special Types
Gulf Shipbuilding Corp.	1	C-2 Cargo
Houston S. B. Corp.	5	EC-2 Cargo
Ingalls S. B. Corp.	1	C-3 Cargo
Jones, Brunswick	4	EC-2 Cargo
Jones, Panama City	1	Special type
	2	EC-2 Cargo
Kaiser Cargo, Inc.	1	Special type
Kaiser, Swan Island	4	Tankers
Kaiser, Vancouver	4	Special types
Leathem Smith S. B. Co.	1	Special type
McCloskey & Co.	2	Concrete Cargo
Marinship	3	Tankers
Moore Dry Dock Co.	4	C-2 Cargo
North Carolina S. B. Co.	6	C-2 Cargo
New England S. B. Co.	8	EC-2 Cargo
Oregonship	1	Victory Cargo
	2	EC-2 Cargo
Pendleton Shipyards Co., Inc.	1	Seagoing Tug
Pennsylvania Shipyards, Inc.	2	C-1 Cargo
Permanente Metals Corp.	23	EC-2 Cargo
Pusey & Jones Corp.	1	C-1 Cargo
St. John's River S. B. Co.	2	EC-2 Cargo
Southeastern S. B. Co.	3	EC-2 Cargo
Sun S. B. & D. D. Co.	6	Tankers
Todd-Galveston D. D., Inc.	2	Coastal Tankers
Walsh-Kaiser Co., Inc.	2	Special types
Western Pipe & Steel Co.	1	C-3 Cargo
TOTAL	134 Vessels 1,372,864 Deadweight Tons	

75,000 Watch Launching of The Carrier Shangri-La

Bearing a name symbolizing America's determination to blast Tokyo into oblivion, the 27,500-ton aircraft carrier of the Essex class with modifications, the U. S. Shangri-la plunged into the Elizabeth river on February 24.

The sponsor was Mrs. James Doolittle, wife of Lieutenant General Jimmy Doolittle, who, on April 18, 1942, led 16 U. S. Army Bombers in the first raid on Japan. The new warship sped down her building ways to the cheers of more than 75,000 spectators, who, a moment earlier, heard Virginia's Governor describe that first raid as a "portent of what is to come."

LAUNCHING OF A SEAPLANE TENDER

With main engines, reduction gears, generators, boilers, engine room auxiliaries and steering gear installed, the Castle Rock, 19th seaplane tender built at Lake Washington Shipyards, was sent down the ways on March 11. She was nearer completion than any vessel launched from this plant.

U. S. Maritime Commission Contracts for Fleet Of Fast Cargo Vessels

The Maritime Commission announced recently that it has contracted for 100 new long-range cargo vessels and canceled an already-suspended contract for 119 Liberty ships.

The cargo vessels are 5000-ton ships which, combined with the 10,000-ton Victory ships now being constructed, are expected to be the nucleus of the nation's post-war merchant marine.

The order increases to 200 the number of the new-type ships on order. Shipyards receiving the new contracts were: Kaiser Co., Inc., Vancouver, Washington, awarded 60 ships; Consolidated Steel Corp., Ltd., Wilmington, California, 18; Pennsylvania Shipyards, Inc., Beaumont, Texas, 18; Froemming Brothers, Inc., Milwaukee, Wisconsin, 4.

The canceled Liberty ship contract was awarded in January, 1942, to the Kaiser Co., Vancouver, Wash., and was suspended six months later.

Inventor of Rubber Life Raft Honored

Under the glare of searchlights, while Navy blimps circled overhead, the Liberty ship J. Frank Cooper slid down the ways at the California Shipbuilding Corporation yards on Terminal Island, California, at a night launching on February 17. The early hour of 2:00 a.m. was selected to take advantage of tidal conditions.

Named for the inventor of the rubber life raft, which has been instrumental is saving the lives of many aviators forced down at sea, the ship was christened by Mrs. Virginia Cooper Campbell of Moffett Field, daughter of the inventor and late executive of Goodyear Tire and Rubber Company. Gathered at the launching in honor of the memory of the man who supervised the construction of most of the envelopes for airships used by the Army and Navy in two wars were many prominent officials of the armed forces, including Capt. T. G. W. Settle, U. S. N., of stratosphere fame.

The Cinnabar, 19th "ship - shaped" concrete barge built at Belair, shown just after her launching.

"M" Award Ceremony Featured At Belair Ship Launching

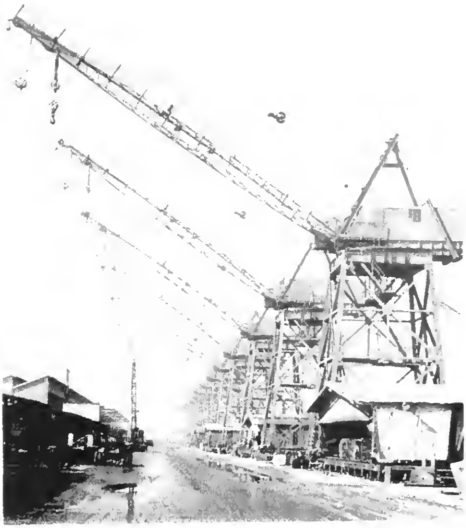
Presentation of the U. S. Maritime Commission's Award of Merit to Belair Shipyard in South San Francisco was made on March 10 at a special ceremony preceding the launching of Belair's 19th ship-shaped concrete barge, the Cinnabar.

Carl W. Flesher, Director of the West Coast Regional Office of the Maritime Commission, made the formal presentation of the Maritime "M" pennant, Victory Fleet flag and employees' merit badges. Acceptance in behalf of the construction firm of Barrett & Hilp, which built and operates the shipyard, was made by the firm's two partners, J. F. Barrett and H. H. Hilp.

"Belair has made the most outstanding record of all shipyards in the nation engaged in building concrete ships," Mr. Flesher told a huge throng of Belair executives and workers who, with their friends and families, had gathered to witness the award of the emblem.

The Cinnabar was sponsored by Mrs. Carl W. Flesher, wife of the Maritime Commission's director, who had as her matron of honor Mrs. Xavier Urrutia, wife of the Chilean consul in San Francisco.

Mrs. Carl W. Flesher, wife of the Pacific Coast Director of Construction and Repair for the U. S. Maritime Commission, was sponsor of the Cinnabar.



CALSHIP ON A SUNDAY MORNING

These huge gantry cranes at Calship's yard on Terminal Island are shown as they appeared on a Sunday morning when most of the yard's employees were taking a day of rest. The cranes have played a major role in the building of over 300 cargo vessels for the Maritime Commission's "Victory Fleet."

Named for the President's Great-Grandfather

The S. S. Warren Delano, named after the seafaring great-grandfather of President Roosevelt, was launched from the Bethlehem-Fairfield shipyard on February 24, at the Baltimore Plant. Mrs. Laura Delano Houghteling, a descendant of the illustrious skipper, sponsored the 298th Liberty ship to be constructed by this yard.

Mr. Delano, who lived from 1779 to 1865, was a famous Boston sea captain and shipowner, whose fleet included the clipper Memnon, which plied the China to Boston run. During the War of 1812 this skipper was captured twice by the British.

Victory Ships Launched at Calship

During the past month or so California Shipbuilding Corp., Wilmington, Calif., had the distinction of launching four Victory ships from its Terminal Island yards. The China Victory, the Greece Victory, the U. S. S. R. Victory, and on March 6 the United States Victory, which slid down the ways after Mrs. Cecil R. King, wife of the congressman from the 17th California District, Los Angeles, christened the ship with the traditional bottle of champagne.

On February 26 the U. S. S. R. Victory, named for one of the "Big Three" of the allied nations, was christened by Mrs. Inna Pastoev, wife of the Soviet vice consul at Los Angeles. Vsevolod Pastoev, Soviet vice consul, gave a dedicatory speech during the ceremony. Also in attendance at the launching were representatives of the Soviet Purchasing Commission and representatives of the Moore-McCormack Line.

Houston Yard Honors War Correspondent

The Liberty ship Keith Palmer, named for the New Zealand-born war correspondent for Newsweek who was killed in a Jap raid on Bougainville last November, was launched at the Houston Shipbuilding Corp. yards, subsidiary of Todd Shipyards Corp., on February 23. The sponsor was Mrs. Harry Kern, wife of one of the magazine's editors. This is the twelfth Liberty ship to be named in honor of a correspondent killed in the performance of duty in a war theater.

Mr. Palmer went to Australia in 1936 as aviation and magazine editor for the Melbourne Herald. As correspondent for Newsweek, he accompanied the Australian Navy in 1942 and in August received the assignment which took him to the South Pacific. He was killed at the age of 37, when a bomb struck his tent during a raid in the Cape Torokiua district of Bougainville Island.

NEW MINE SWEEPER

Another mine sweeper built in the plant of the Winslow Marine Railway & Shipbuilding Company, Bainbridge Island, Washington, has successfully completed her trial runs.

Christening of U. S. S. Pine Island

"I christen thee Pine Island," said Mrs. Knefler McGinnis, sponsor, as she smashed the bottle of champagne against the bow of another seaplane tender launched at Los Angeles Shipbuilding and Drydock Corp. on February 26. This seaplane tender was the second vessel of this type built in the yard, and first ship launched since the Todd Shipyards Corporation became managing agent.

The sponsor, wife of Captain McGinnis, commanding officer of the U. S. Naval Air Station, Terminal Island, had as her maid of honor Virginia Schakel.

Conforming to the Navy's custom of naming seaplane tenders after bodies of salt water, such as ocean inlets, the Pine Island is a namesake of a sound on the west coast of Florida near Fort Meyers.

500th Ship Goes Down The Ways at Richmond Yards

With the launching of the S. S. Amerigo Vespucci early in March, a record-breaking achievement of 500 ships launched in less than three years is claimed at the Richmond Shipyards of the Permanente Metals Corporation. This was the 500th ship for the U. S. Maritime Commission to slide down the ways of the four Richmond shipyards on San Francisco Bay since the first keel was laid in Yard No. 1 back in April, 1941.

Mare Island Navy Yard Launchings

The U. S. Navy yard at Mare Island, California, late in February launched the following naval vessels:

The U. S. S. Finnegan, a destroyer escort launched on February 22, sponsored by Mrs. Charles Schroeder of Waukegan, Illinois, sister of the late Ensign William Michael Finnegan, who died on December 7, 1941, aboard the U. S. S. Oklahoma. He was awarded the Purple Heart Medal posthumously.

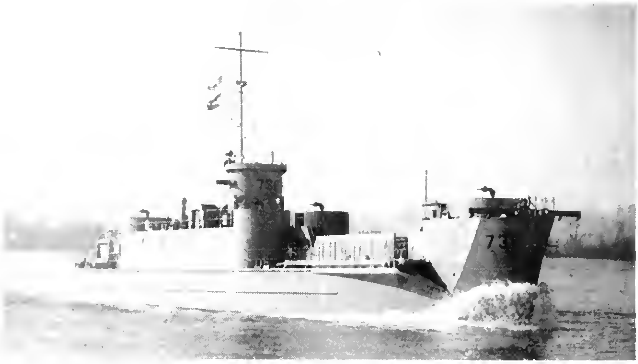
The U. S. S. Creamer, a destroyer escort, launched on February 23 and sponsored by Mrs. Dora E Creamer, mother of the late Ensign William Wilson Creamer, U. S. N. R. Ensign Creamer was awarded the Navy Cross for extraordinary heroism and distinguished service beyond the call of duty as pilot of Torpedo Squadron Eight in the Battle of Midway in June of 1943.

Commercial Iron Works Ahead of Schedule

Honoring employees of the Commercial Iron Works, Portland, Oregon, who have shown over a period of years their loyalty and devotion, the company has recently taken to naming the men and women workers as sponsors. On February 13, at a double launching, Hulda Hegart, supervisor in the accounting department, was chosen to christen the LCI(L) 736, 600th ship launched in the Portland area since the start of the present war program. The LCI (L) 737, sister ship, launched at the same time from the famous marine railway, was sponsored by Mrs. Emil Hedberg, wife of a long-time machinist at the plant.

A pioneer on the Pacific Coast in the building of invasion craft, which the Navy holds to be highly important at the present time, the Portland firm is well on its way to [illegible] known as the most versatile sh[illegible] in the country. Since February, 1941, when it launched the first steel vessel in the Portland-Vancouver area since the first world war, the company has launched well over 80 ships for the Navy, leading all other local yards by a wide margin. Among others, the company has built or is now building net tenders, mine sweepers, sub chasers, Navy tugs, landing craft and net layers. In addition it has been engaged in conversion work on several types, including aircraft escort vessels.

The management of the company recently issued to the press a statement of future work possibilities. According to Winston Casey, president, and Henry White, executive vice president and general manager, "Commercial Iron Works is on or ahead of schedule on all of its contracts, and all departments, shipbuilding as well as conversion and repair, will be kept busy through 1944 and 1945 in maintaining the schedule of ship deliveries."



LCI (L) 736, 600th ship launched in Portland area since start of the war, was constructed and recently launched at Commercial Iron Works, Portland, Oregon.

Navy Hero Honored at 12th Naval District Launching

When the U. S. S. Paul G. Baker, a destroyer escort, was launched on March 12 at Bethlehem Steel Shipyards in San Francisco, its sponsor was a "Navy wife." She is Mrs. Katherine E. Baker of South Gate, California, widow of Lieutenant (jg) Paul Gerald Baker, U. S. N., Navy flyer for whom the ship is named.

Mrs. Baker is an electrician's helper [illegible] U. S. Naval Drydocks, San [illegible] has been working [illegible] death. He was a [illegible] fighting squadron on [illegible] in the Coral Sea Battle of May 7, 1942, and was awarded the Navy Cross posthumously.

Present at the launching were the Baker children: Jay Baker, 9, and Judith Baker, 7, with Mrs. Marjorie Rutherford, matron of honor, wife of the late Lieutenant Harold E. Rutherford, another Navy hero.

On March 12 the U. S. S. Paul G. Baker, a destroyer escort, slid down the ways of Bethlehem Steel Company's San Francisco yard. She was sponsored by Mrs. Katherine R. Baker, widow of Lieut. (j.g.) Baker, a member of a fighting squadron on the U. S. S. Lexington, who was killed in the Coral Sea Battle on May 7, 1942.

Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

New Lead Bearing Grease

Howard Drullard of San Francisco is manufacturing and marketing a special grease called Lead-Cote, which has proved itself in the mines of America as being an ideal lubricant for open gearing. It is here suggested that this lubricant would be ideal for open gearing aboard ship, such as winch and windlass gearing.

Lead-Cote is made by thorough mixing of a 350 mash oxide-free powdered lead and a first-class gear grease. It is applied cold to a new gear or over old grease on a gear in service, and will immediately reduce noise and friction. This compound is very tacky and will not throw. It contains 25 per cent of metallic lead, and this lead powder quickly forms a low-friction coating on all contact surfaces. This action quickly builds up a very smooth, almost self-lubricating surface that prevents wear and eliminates noise.

Users report as high as 80 per cent reduction in gear grease consumption. It eliminates greasy floors or decks. Its cost is far more than offset by the reduction in maintenance and power costs.

Lead-Cote is shipped in 25- and 50-pound pails and in 150-pound barrels, 325-pound half barrels and 500-pound barrels. The manufacturers guarantee satisfaction.

New Thread Grinder

The Dalzen Tool and Manufacturing Company announces a new type of thread grinder, electronically controlled by General Electric's Thy-motrol drive. The new machine is said to provide the highest possible production of threaded parts, thread gages, straight and spiral fluted taps and thread milling cutters.

Outstanding advantages of the machine are claimed in complete control of work quality, ease of operation, and speed of uniform production. Speeds of work and grinding wheel are individually controlled by dial settings. This variation is stepless and the ratio of speeds infinite in both forward and reverse.

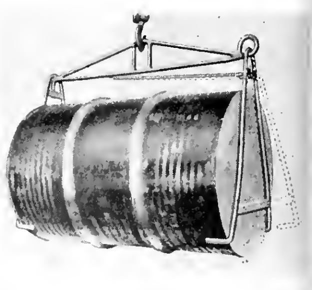
The new thread grinder is available in two models. The No. 5 universal machine handles a wide variety of work up to 9¾″ length of thread any place on a 20″ shaft. Cutter relief may be ground up to .025″ per ⅛″ length of land. Cutters with as many as 24 flutes may be relieved. The No. 6 production model without back-off feature handles work up to a full 20″ length of thread on a 20″ shaft.

The new thread grinder.

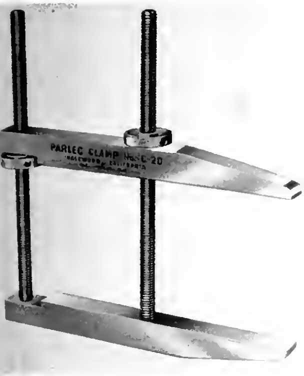
New Barrel Cradle

Especially designed for picking up barrels and plywood or fiber drums without chimes (flush ends), a new barrel cradle may also be used for picking up any other type barrel or drum. It is built of heavy bar stock, and is of welded construction. Palmer-Shile Co., Detroit, Michigan, are manufacturers of the cradle.

One end is built rigid, while the other is pivoted and provided with a strong spring, which simplifies engaging of cradle fingers to any type drum or barrel.



Barrel cradle.



New Parlec clamp.

'arlec Clamp

A new clamp for holding small vork together in tapping, drilling, tc., is announced by Earl C. Parkhurst, Inglewood, California.

The new Parlec clamp is of unusu lly simple design, consisting of two ase-hardened steel jaws, two case-hardened steel adjustment nuts and wo heat-treated steel studs The tuds are solidly fastened into the ower jaw of the clamp, and one of he adjustment nuts is screwed on the ear stud Then the upper jaw is slid nto place on the studs and the other djustment nut screwed into place on he front stud. Thus the top jaw is novably controlled by the two adustment nuts, the front nut acting as pivot and the rear nut exerting the ripping pressure. Both nuts have inholes for quick, easy hand adjustnents. A quick turn of the rear nut eleases pressure instantly. As the adustment nuts are close to the clamping jaws, tightening torque is more ositive than on conventional designs. Jaws are tapered on the ends o allow clamping under a shoulder r recess

New Speedometer-Log

Development of a highly-sensitive nstrument to register accurately at ll times the speed and distance traved of sail and motor yachts is anounced by the Kenyon Instrument Company, Inc. The new device nown as the Kenyon Speedometer-Log, is a combination of three instruments in one, namely, a speedometer, a log and a ship's clock.

The clock, which may be mounted in any part of the ship, contains an electrical circuit interrupting device which transmits timed impulses to the integrating mechanism in the indicating unit of the Speedometer-Log. The speedometer unit operates from a pivoted strut which projects through the bottom of the boat. Water pressure on this strut moves liquid-filled bellows, and changes in pressure thus introduced into the hydraulic system are in turn transmitted to the conveniently-placed indicating dial.

The distance the boat has traveled is determined by a feeler arm, which is released every thirty seconds by the clock. The arm makes contact with a cam on the speedometer pointer shaft, and the length of the arm's swing is limited by the cam, which in turn is limited by the speed of the boat This instrument will be very valuable in navigation by dead reckoning.

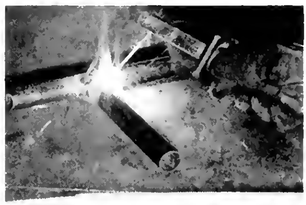
New Long-Taper Pipe Reamer

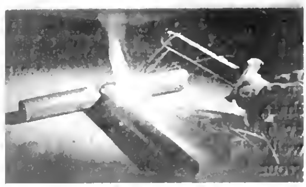
A new pipe reamer of extra long taper design has been added to their line of pipe tools by The Ridge Tool Company of Elyria, Ohio. As a result of the long taper, this Ridgid reamer is claimed not only to avoid flaring, splitting or reducing wall of pipe, but to cut burr unusually cleanly and easily from the inside of pipe or conduit. It is furnished with ratchet handle, or can be used with the ratchet handle of Ridgid No. 00R Ratchet Threader.

Lamp Cuts Welding Time 20 Per Cent

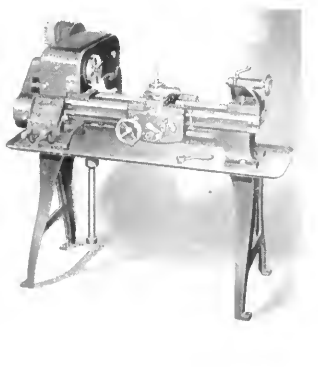
Research Engineer A. B. White, welding expert for the Westinghouse Electric and Manufacturing Company, is shown testing a new lighting system he is developing to speed on welding of airplane parts and other war equipment. Directed on the part being welded, the lamp's brilliant beam enables the welder to see what he is doing through the dark glow window in his hood. This eliminates raising the hood between each weld to position the welding rod. The re-[illegible] time for most welding jobs is 20 per cent plus a reduction in amount of work and materials spoiled by touching the welding rod at the wrong point on the pieces being welded.

What the welder sees through the window of his hood is illustrated in these three views. In the upper one the brilliant arc provides the only light for the welder to see by, and when it goes out the welder is blind and must raise his hood to position the welding rod. The difficulty of seeing what is being done through the glare of the arc is clearly illustrated. The center view shows how easily the welder can see through the glass of his hood to position the welding rod, as the powerful lamp supplies ample light on the work. The bottom view is visual proof of the brilliance of the beam, for even with the arc struck, the surrounding brightness is apparent and the glare of the arc has been effectively reduced, resulting in easy and accurate seeing.





New lighting system to speed welding.



Quick-Change Gear Lathe

A new quick-change gear lathe manufactured by the Logan Engineering Company, Chicago, Illinois, is proving of special value where frequent changes in operating feeds must be made. The Logan quick change gear box is so simple and "foolproof" in operation that even inexperienced workers quickly learn its operation. By simple adjustment of its two levers, screw threads from 8 to 224 per inch are quickly available, and by changing the 24 tooth stud gear for the 48-tooth stud gear furnished with the lathe, additional threads from 4 to 7 per inch are available. Similarly, longitudinal power feeds from .0015" to .1000" per revolution of the spindle may be obtained. The entire assembly is sturdy and accurate, with precision cut steel gears and self-lubrication bearings. The index plate which guides the operator in gear changing is very legibly marked.

Another feature of this lathe which appeals to production men is its automatic apron, which operates from a spline in the leadscrew through a worm drive and friction clutch for both longitudinal and cross feeds. For cutting threads, an additional longitudinal drive operates from half nuts on the leadscrew. An important safety feature makes it impossible to engage both drives at the same time. Worm and gear operate in a bath of oil.

Features include: "Pre-Loaded" ball bearing headstock, which provides sustained spindle accuracy; patented 3-point suspension of countershaft, which eliminates vibration even at high speeds; and a heavy, well-ribbed bed with precision ground V and flat ways, usually found only on large engine lathes. Swing over bed is 10½", bed length is 43⅛", and distance between centers is 24".

New Air Filters

Three new impingement type filters by Air Devices, Inc., New York, have a special expanded-metal filter mesh design, which results in lower initial resistance and high efficiency, even when heavily dust-laden. The filters can be removed, cleaned and recharged in minimum time. Vents in frame aid in quick cleaning and thorough draining.

The Badger air filter, available in 1-in. and 2-in. thicknesses, and many sizes ranging from 100 to 600 sq. in., is specially designed for ventilation and air conditioning service.

The Permo-Aire filter, recommended for extra heavy duty and industrial air cleaning services, is supplied in 2-in. and 4-in. thicknesses with areas from 100 to 1200 sq. in. Filtering efficiency is as high as 98.5 per cent.

The Permo-Aire Grease Filter for safe galley ventilation efficiently removes grease from kitchen fumes, avoids danger of grease fires, protects mechanical equipment and insures better sanitation.

York on 3100 Vessels

Marine refrigeration and air conditioning equipment for more than 1100 U. S. cargo ships and 2000 naval vessels from battleships to fleet tugs is now being produced by the York Corporation, S. E. Lauer, president, reported. This represents a 44 per cent increase in the company's volume of marine business in a 12-months' period.

A major part of this equipment, valued at $12,300,000, has been refrigeration for Liberty ships, more than 1000 of which have been eqipped by York since Pearl Harbor, Mr. Lauer said. Recent contracts call for similar installations on 133 of the new Victory ships. Total refrigeration capacity of the firm's marine installations during the period is equal to the cooling effect of 15,000,000 pounds of ice melting every 24 hours.

Air conditioning for all types of fighting ships, including aircraft carriers and submarines, has been the most urgently needed of York's marine production. By now the entire U. S. submarine fleet has been outfitted with cooling equipment to prevent temperature and humidity from rising to a point where normal working efficiency is impaired. Lacking air conditioning, the modern sub with its increased amount of machinery and accessories would be limited to much shorter periods of operation under water.

Development of new sensitive detection devices and fire control mechanisms has made air conditioning essential for nearly all modern fighting ships. Instrument and fire control rooms must be conditioned to protect both the delicate apparatus and the men who operate it against natural and artificial heat. Another use of air conditioning is in the ready rooms of aircraft carriers where pilots assemble in heavy gear to receive their last-minute flying instructions. In warm climates where temperatures soar above 100 degrees, these rooms are cooled to make the wait bearable.

In both the Navy and the merchant marine, advances in refrigeration equipment design, development of quick-freezing methods and improved storage techniques have now made it possible to maintain a more continuous supply of fresh foods for ships' crews at little increase in refrigerated area. Modern refrigerants in smaller, more efficient compressors have contributed to this development. Quick-frozen foods, packaged and made compact by removing excess bulk, have also helped by reducing the need for canned foods, and in doing so have conserved tin supplies. In the Navy, even milk is part of the crew's daily diet, supplied by a device called the "mechanical cow," which automatically mixes powdered milk, butter and water, chills it and doles it out fresh for each meal. Scientifically homogenized, this mixture has the same flavor and nutritional value as fresh milk.

As part of its marine program, York has now trained hundreds of Navy enlisted men in its own refrigeration and air conditioning school, established three months before the U. S. entered the war. First one of its kind in the country, the school is supplying a major part of all the Navy's new refrigeration technicians. Originally started for instructions in handling submarine instruction classes have now been broadened to include all Navy vessels and land bases, as well as training in running the York stratosphere testing chamber for flight training.

Hot off the Press

The seventy-fifth anniversary of he Penn Metal Corp. of Pa. is preented in a 32-page booklet comnemorating the founding of the firm. nd of its founder, Longley Lewis ;agendorph. The history of the comany is traced from its inception in 869, interwoven with the significant ndustrial events down through the ears.

• • •

A reference data book entitled The Improvement of Metals by orging" has been published by The teel Improvement & Forge Co., Cleveland, Ohio. Through the use f technical data, charts, photographs nd detailed drawings, the booklet resents 36 pages of factual informaon resulting from years of practical orging experience.

• • •

"G-T Packings" is the title of a ulletin published by Greene, Tweed ? Co. of New York, and is a helpful uide for the selection of packing. resenting many different fluids hanled in process work and general lant services. It also lists the correct acking of each liquid, gas and vapor. nd includes tables of sizes and reights.

• • •

Bulletin GS-10, published by the Condenser Service & Engineering Co. of Hoboken, N. J., called the Bevel Gear Universal Joint," decribes a new precision-cut manganese bronze bevel gear universal joint with angular range of 0° through 360° on horizontal center line.

• • •

Stellite information is presented in a booklet entitled "Operating Information on Stellite 98M2 Cobalt-Chromium-Tungsten Turning and Boring Tools and Milling Cutters," and is offered by Haynes Stellite Company, Kokomo, Indiana, a unit of Union Carbide and Carbon Corporation. Through drawings, photographs and charts, this 8-page booklet explains the cutting angles, speeds and feeds, chip-breaker grinds, etc., recommended for use in Stellite 98M2 turning and boring tools and milling cutter blades.

• • •

Victor Equipment Company of San Francisco has published a bulletin on Gas-O-Dome regulators. These regulators have gas-loaded instead of spring-loaded diaphragms, and are made for inlet and delivery pressures much higher than can be handled adequately with spring-loaded diaphragm regulators. Some models can handle delivery pressures up to 1000, 2000, 4000 and 5000 psi. These regulators are easy to operate and are safe.

• • •

A 32-page booklet, "Powder Metallurgy," covering the advantages and latest applications of powdered metal parts, has recently been published by Keystone Carbon Company, Inc., St. Marys, Pennsylvania.

Part of the booklet is devoted to Selflube porous bronze bearings; Selflube porous iron bearings; D-10 graphite impregnated brass bearings, with listings of standard shapes and sizes available and technical data on performance, installation and care; designers' aid section and the table on engineering properties as well as standard form of design and specification.

• • •

"The Mengel Company Since 1877" is the title of a booklet being distributed by The Mengel Company, Louisville, Ky., producers of hardwood plywood, manufacturer of furniture and allied wood products. The booklet traces the company's growth and development and stresses the concentration of war production. Included are illustrations of such war products as Army cargo truck body parts, aircraft plywood, military boat plywood, etc.

• • •

New marine products catalog, No. 43, issued by the J. A. Zurn Mfg. Co., Erie, Pa., gives complete and authoritative information of scupper valves, strainers, deck drains, etc. This catalog is especially handy for expediters in the marine field, as it presents in one volume the technical information on a wide variety of products. It has time-saving references, and is illustrated with photographs and dimensional drawings.

• • •

"Technical Books" is the title of a new catalog on this subject issued by The Chemical Publishing Co., Inc., Brooklyn, N. Y. The catalog includes the latest books on chemistry, technology, physics, general science, mathematics, engineering, radio, aviation, foods, formulas, cosmetics, gardening, medicine, metals, and technical dictionaries, and is a handy reference to anyone interested in keeping up with the latest technical and scientific progress.

• • •

Eutectic Welding Alloys Company of New York City has recently published a 36-page welding data booklet. It covers timely facts on low temperature welding for fabrication, salvaging and general maintenance in all types of war industries. A special chart of unusual interest is included to simplify rod selection and use.

YOURS FOR THE ASKING!

The manufacturers named in this HOT OFF THE PRESS department will gladly furnish, without obligation to you, copies of the trade literature reviewed in these pages. For quick service, please use this coupon.

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TRAINING TECHNICAL FORCES

(Continued from page 71)

delivery of the material emphasized certain shipboard installation problems which can be taken care of in design. The limits of possible deviation from the plans and the effect which might be the result of not following requirements of different equipment were made clear to the practical supervisor.

In the organization of future classes, the plan is to have a course where engineers working in different sections of the design department will become familiar with the problems and demands of each department. The topics of mechanical, electrical and structural engineering as used in marine practices will be discussed in the same class; thus the often observed indifference of men from one branch of engineering to the requests of another will be eliminated. A supervising foreman will become familiar not only with the branch of science which governs his field but also with other related sciences. This method of training undoubtedly will bear fruits by introducing scientific principles more and more into industry. This idea will make science a real servant of men in the great production efforts undertaken by this country.

Technical men are one of our national resources which must be properly developed. By digging into the ingenuity and experience of human brains, unforeseen fields can be opened for utilization. The influence of technical men must be felt throughout the cycle of production. By continuous training within industry, by keeping up with the latest in science, by contact with others and interchange of ideas, they can give assistance in solving everyday problems in shops and on board ships. They can develop themselves and be of value to craftsmen, workers, their company and their country. A strong engineering group will be in a position to deal with any problem created by technological progress.

YOUR PROBLEMS ANSWERED

(Continued from page 79)

(19) Open the throttle valve to its full extent; then close it about one-half turn.

(20) Close all drains.

Running

(21) Observe the oil level in the tank.

(22) See that the pump delivers an ample supply of oil to the bearings and hydraulic cylinder. The gages should indicate the pressure for the bearings and for the pump discharge.

(23) Regularly determine the temperature of the bearings. A fair running temperature of the return oil is 140 F. to 160 F. The maximum temperature should not exceed 175 F.

Stopping

(1) Gradually diminish the load and remove same; check the emergency governor as explained under **Emergency and Tripping Device**, in order to make sure that it is in good operative condition. Shut the machine down by releasing the emergency valve by its emergency tripping device to insure the free working of these parts.

(2) Shut off the supply of cooling water to the cooler before the turbine comes to rest. When the machine is not running, do not allow cooling water to run through the cooler.

(3) Also, before the turbine comes to rest, shut off the steam supply to the packings.

(4) Close the stop valve ahead of the throttle valve.

(5) Open the drain ahead of the throttle valve.

(6) When the machine is shut down, if only for a short time, take every precaution to guard against steam bleeding into the turbine casing in order to protect the internal parts that are subject to corrosion.

(7) If the turbine is running condensing, stop the vacuum pump and open all drains after about twenty minutes of continued operation of the air pump. This is to draw out all vapor and water from the turbine in order to prevent internal corosion.

WELDING FITTINGS

(Continued from page 85)

installed in half the time, because large units can be preassembled away from the crowded hold.

Since it is an accepted fact that a welded line is stronger than the parent metal, the welding-fitting' gives the double advantage of lighter construction and greater strength. It is leakproof and is unaffected by the vibration of the ship, a safety factor which cannot be overlooked. With the elimination of bulky fittings, insulation of a ship's steam piping takes only a fraction of the time it once took.

New naval applications for Tube Turns are being discovered every few days. Tons of weight are being eliminated and hundreds of cubic feet of space are being made available in a single ship. Multiply this by the thousands of ships being turned out and you have a quick answer why welding-fittings are in demand wherever keels are being laid and hulls are going down the ways.

Two Examples

A single section of a Liberty ship's fuel oil suction and transfer piping system (Fig. 1) using cast fittings and flanges requires a space 15′ 10″ long and 7′ 5″ high. With welding-fittings the same section (Fig. 2) goes into a space 14′ 7¼″ long and 3′ 6½″ in height.

The number of flanges used is reduced from 88 to 21, and the number of flanged joints is cut from 48 to 14. The number of studs and nuts is reduced from 1452 to 432, and, most important of all, the welded section saves 5014 pounds of critical metal—more than 2½ tons.

In a single section of the fire main and salt water lines on an escort type of aircraft carrier it was found that a saving of 15,438 pounds was made possible by the use of Tube Turns. The required height for the flanged construction (Fig. 3) was 10 feet, but the welding-fitting construction is only 6′ 9″. The 19′ length was reduced to 14′ 9″ (Fig. 4).

Running LIGHTS

Who When Where

Edited by B. H. Boynton

Philip G. Crawford, president of the Port of Seattle Propeller Club, introducing to members the master of ceremonies of the day, C. W. "Cotton" Wilcox (seated).

Training Within Industry

Featured at Seattle Propeller Club

Members of the Propeller Club, Port of Seattle, turned in a near record attendance at a recent meeting conducted by Associated Shipbuilders at the Arctic Club in Seattle.

Following introductory remarks by Philip G. Crawford, newly elected president, the meeting was turned over to the capable hands of C. W. "Cotton" Wilcox, assistant to the general manager at Associated Shipbuilders. Mr. Wilcox, a former All American football star, "carried the ball" for the entire meeting, and introduced Raymond J. Huff, vice president and secretary of the Puget Sound Bridge and Dredge Company, [illegible] organization of the joint [illegible] Associated Shipbuilders.

[illegible] the event [illegible] Moore and R. S. Boaz, representing the Victory Speakers' Club which, with the sanction of the War Manpower Commission, recently completed an exhaustive survey and investigation of employee training methods in plants throughout the Northwest.

The first speaker, Mr. Moore, presented the problem, "What's Wrong with Management and Labor?" He said:

R. S. Boaz explains the results of an exhaustive investigation of Northwest employee training while co-speaker George Moore looks on.

"One plant normally operated with 1200 employees. As a result of the war they have increased their personnel to 3500. This called for a great deal of additional supervision, and they were without trained supervisors. Personnel department records indicated that almost 60 per cent of the labor turnover was attributed to lack of good human relations between supervisors and workers."

The second half of the study was explained by R. S. Boaz, a member of the investigating committee, who made the following statements:

"We learned that our Government has recognized this problem of management, and from conferences in Washington a training program has been developed and proved, and put into operation through the War Manpower Commission.

"An excellent example of this program is in operation at Associated Shipbuilders, where through proper application of training they have reduced their 'spoiled work' to such an extent that it has saved them almost one-half million dollars in materials alone, to say nothing of the resultant tremendous saving in man-hours.

"Mr. Wilcox made arrangements in the plant for the Training Within Industry program to be presented to all supervisors on 'job instruction.' The method is based on this simple formula:

(1) Explain thoroughly the requirements of the job.

(2) Demonstrate how it should be done.

(3) Have the worker do the job in front of the class.

(4) Have the worker explain **why** he did the job in the way it was demonstrated.

"Records indicate that there have been less than 1/10 of one per cent of employee terminations since this training system became effective.

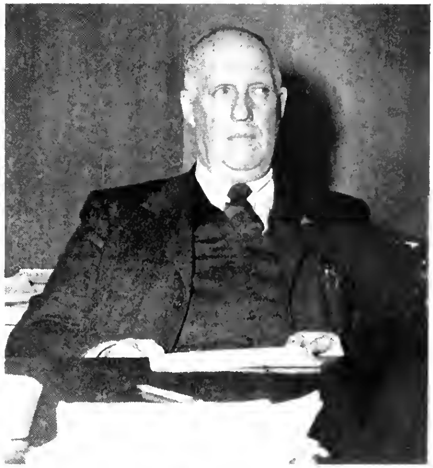
"The Job Methods program taught the supervisors to study the performance of every job with a view of improving the method of operation. If a worker has a suggestion he writes it out on paper and turns it over to George Shaw, Director of Supervisory Training, who has the paper copied and a number assigned so that the worker's name does not appear on the suggestion. This is then sent to the foreman to the department affected, who makes a test of the idea and reports his findings. Upon acceptance, Mr. Shaw notifies the worker and informs him of the award decided upon by the Labor-Management Committee.

Left: George H. Stebbins, general manager of Associated Shipbuilders, outlined the company's history during the war. Center: Milo Kinn, cartoonist for "Floodtide," Associated Ship's plant magazine, entertained the Club with series of cartoons. Right: Raymond J. Huff, high lighting the history of Puget Sound Bridge and Dredge Company.

U. S. Maritime Commission West Coast Yard Inspection

Kaiser Cargo Co., Yard N. 3

Richmond, California


C. H. Walls, resident plant engineer, U.S.M.C.

MACHINERY INSPECTORS

Front row: Left to right: Leo McGill, senior inspector; Donal Bivin, senior inspector; William A. Correia, principal inspector; Roy W. Shipley, senior inspector; Fred J. Allen, senior inspector; and Cyrus C. Graves. Standing: C. R. Berestord, G. E. Walton, G. B. Nichols, F. E. Tees, A. T. McCulloch, C. J. Truelsen, H. F. Lybarger, John J. Harrington, John C. Wiltse, T. M. Holme and John V. Mickelson.

HULL INSPECTORS

Front row, lett to right: William F. Lange, senior inspector; A. R. Brown, first senior inspector; William Anderson, principal inspector; Alton C. Perring, senior inspector; John T. Brusstar, senior joinery inspector; and Peter Oakes. Standing: Frank M. Goy, Cornelius Hansen, Frank H. Small, John E. Avila, L. H. King and Pat J. Lydon.

Commander C. M. Wassell, U.S.N.; and President Max Linder, Propeller Club of Los Angeles-Long Beach.

Propeller and Bilge Clubs of Los Angeles Harbor Hold Joint Meeting

Commander C. M. Wassell, Medical Corps, U. S. Navy, was the principal speaker at the joint meeting of the Bilge Club and the Propeller Club of the United States (Port of Los Angeles-Long Beach No. 66), March 16 at the Pacific Coast Club in Long Beach. Commander Wassell was awarded the Navy Cross with citation, for evacuating wounded members of the crews of the U.S.S. Houston and Marblehead, from Java across the Indian Ocean to Australia. "The Story of Dr. Wassell" is the title of a new Paramount film, a goodly portion of whose gate receipts will be turned over to Navy Relief. Commander Wassell, an outstanding American naval hero, who was personally pointed out in a radio address by President Roosevelt for heroic action in saving many lives during several naval engagements, thrilled the big audience with his first-hand account of the war in the South Pacific.

An amusing side light of the meet was the presentation speech of District Manager F. A. H[illegible] American-Hawaiian S. S. Co. [illegible] the award of a ship [illegible] Propeller Club's chaplain [illegible] Rev. Jimmie Brough[illegible]

AWARDS

Gold Star to Buckler-Chapman

Presentation of its first Gold Star to be added to its Maritime "M" pennant was made to Buckler-Chapman, ship joiners, Portland, Oregon, according to a recent letter from Rear Admiral Howard L. Vickey.

"The employees of your company should feel proud of this award for it has been justly earned . . . " wrote Vickery.

During the month of February, Buckler-Chapman completed joiner outfitting on its 330th Liberty ship, last of the series delivered from Kaiser's famous Oregon Shipbuiding Corporation yard.

Hyde Awarded Third "E" Star

The third star has been added to the Army-Navy "E" Pennant of the Hyde Windlass Company of Bath, Maine. In the letter renewing the award for the third time, Admiral C. C. Bloch writes, "It is difficult to win this award in the first instance, and to continue the requirements necessary for a renewal is a remarkable performance."

The Hyde plant is producing Steering Gears, Windlasses, Winches, Capstans and Propellers for the U. S. Navy. The third renewal of the Army-Navy "E" Award is very gratifying to all Hyde employees who consider it a tribute to Hyde engineering and manufacturing skill.

Austin Men Cited by Navy In Pacific Northwest

Sixty key employees including engineers, construction men and others in The Austin Company's organization which has completed more than $75,000,000 worth of Naval facilities in the Pacific Northwest, received individual citations for meritorius civilian service from the Navy Department, Bureau of Yards and Docks, on March 8, following a dinner in their honor at the College Club.

Captain G. A. Duncan (CEC) USN, Public Works Officer, Thirteenth Naval District, Seattle, and Officer in Charge of Construction, in making the awards for the Navy Department, applauded the performance of these men and women whose efforts "beyond the line of duty" set the pace for economy, efficiency and speed in the completion of a number of air stations; two radio stations; large fuel, ammunition and supply depots; a large hospital; several bases, airfields and training schools, and other related Navy Department Shore Station facilities.

The presentation of individual citations to the employees marked the first awards to a group of such size in the Pacific Northwest, where over a year ago 4,600 Austin employees engaged in the same work received the first Army-Navy "E" presented for construction in this area.

Captain G. A. Duncan, public works officer, 13th Naval District, is shown pinning Civilian Meritorious Service award on W. R. Engstrom, Austin Compaany vice-president, while company and Navy officers look on.

Joseph A. Moore, Sr., officiated at the reception and at the launching. Here he is seen reacting to an unusually lusty breaking of the champagne bottle.

(Top) Lynn H. Korndorff and his charming wife, pose for Ray Maulin a few moments before the christening.

(Center) The sponsor appears with Mrs. Charles F. Bulotti, wife of California's favorite singer.

Moore's Launches the Flying Yankee

Launching of the S. S. Flying Yankee, C-2 vessel built by Moore Dry Dock Company at Oakland, for the U. S. Maritime Commission, was made a news worthy event by the choice as sponsor of Mrs. Lynn H. Korndorff, wife of the president of Federal Shipbuilding & Dry Dock Company, Kearny, New Jersey.

This most recent product of the Moore yard slid down the ways on Saturday, March 25.

(Below, left to right) Mrs. Jas. A. Moore, Sr., Mrs. Bernard De Rochie, Mrs. Daulton Mann, Mrs. Korndorff (sponsor), Mrs. Fred Shingle and Mrs. James S. Hines, a sextette which added much sparkle to the Event!

Maritime

Coast Firm of

By Sam Gazzano

Director of Industrial Relations, Joslyn & Ryan

The U. S. Maritime Commission has awarded the well-known firm of Joslyn & Ryan, naval architects and marine engineers, the Maritime "M" pennant in recognition of outstanding production achievement resulting from the completion in record-breaking time of complete working plans and bidding specifications for all material and equipment for the construction of two groups of combat transports of a new design.

The construction of these vessels is being undertaken by the Maritime Commission at the request of the General Staff, and as a result of collaboration between the Commission and the Chief of the Bureau of Ships, final decisions as to design and other details were reached. Owing to prior heavy commitments, certain shipyards and naval architects, who were approached to do this work at that time, were unable to guarantee delivery of plans and bidding specifications in the time set for the first keels to be laid, and as a result the Maritime Commission turned to the West Coast for assistance in this most urgent project.

In July of last year, Rear Admiral Howard L. Vickery, vice-chairman of the Maritime Commission, and Carl W. Flesher, regional director of construction for the Maritime Commission on the Pacific Coast, called on Paul L. Joslyn and Michael J. Ryan for the purpose of discussing the matter of designing these vessels. When Joslyn & Ryan were apprised of the urgent need for these vessels, which had already been designated as having the number one priority on the Maritime Commission's building program for the entire country, they agreed to undertake a contract for the the design of the ships. This undertaking had particular significance for the reason that this firm agreed to complete working plans for the ves-

Michael J. Ryan, partner of the naval architect firm, delivering an address of acceptance of the "M" pennant.

Representing over 500 members of the Joslyn & Ryan staff, "M" badges were bestowed on Mrs. Maude Merritt, Carl Lindberg, Warren Sallenberger, David Lee and William Winter.

Commission Honors Naval Architects

Paul L. Joslyn, partner, expressing his appreciation of the honor bestowed upon his firm.

sels in less than half the time ordinarily required for development of plans for a major design. Rear Admiral Vickery and Mr Flesher had every confidence in the ability of this firm to prosecute the work efficiently and on schedule, for the reason that both Mr. Joslyn and Mr Ryan have a very extensive experience in the design of practically every type of naval and merchant ship, and also in view of their record in turning out designs for the majority of Pacific Coast yards.

At the time the Maritime Commission contract was placed the firm was completing a design for a group of seaplane tenders to be built by the Seattle Tacoma Shipbuilding Corp at Tacoma, Washington, which work would not be completed until September 1, 1943. Rear Admiral C. L. Brand of the Navy's Bureau of Ships and Captain C. O. Kell, U.S.N., Supervisor of Shipbuilding for this district, agreed to expedite the speedy completion of the seaplane tender design in order to clear the decks for the Commission's combat transports. Most of the existing staff of the company were not able to get to work on the new design until the latter part of September or the first of October.

At the direction of the Maritime Commission, the Greenwood Building at 149 New Montgomery Street, San Francisco, was taken over by the firm, whose staff had increased from 250 persons to 550, and such expansion made necessary extensive alterations to the office facilities. The staff, for the most part inexperienced designers and draftsmen in modern marine engineering and naval architecture, had to be trained by a number of engineers and designers brought

Left to right: Michael J. Ryan, Carl W. Flesher, regional director of the U. S. Maritime Commission; Bradford Melvin, who was an able master of ceremonies, and Paul L. Joslyn.

On behalf of the U. S. Maritime Commission—tribute for a job well done!

out from the East to assist in this work.

The work, which involved development of plans covering every detail and complexity of these combat ships, including preparation of detailed bidding specifications or material requisitions needed for the procurement of all machinery, equipment, steel and other material necessary, was completed on February 15, 1944, exactly four and one-half months from the time work was commenced. This is a phenomenal achievement when it is considered that the usual time for a major ship design requires from ten to fourteen months.

The work involved a high degree of coordination between the various Maritime Commission's regional offices, the Navy Supervisors of Shipbuilding at San Francisco and San Pedro, the Consolidated Steel Corporation at Wilmington, and the Walsh-Kaiser Company's San Francisco office and Providence, Rhode Island, yard; together with a large number of manufacturers, amongst them some of the most prominent manufacturers of marine machinery and fabricating equipment needed for these vessels. Thanks to such coordinated effort the design work was completed, plans delivered to the yards [illegible] keels were laid on schedule.

The presentation of the Commission's "M" pennant and Victory flag by Mr. Flesher took [illegible] of the company's offices at San Francisco, on Saturday, March 25, before a crowd of several thousand persons, made up of employees, guests and friends.

Michael J. Ryan accepted the flag and pennant for the company and delivered the address of acceptance. The flags were raised into position by E. M. Breingan, principal naval architect, and D. S. Macaulay, principal marine engineer.

Paul Joslyn expressed his appreciation of the great honor accorded his firm, and expressed his gratitude to the employees of the company, whose untiring efforts and patriotic fervor made possible the rapid completion of the work.

Mr. Flesher also presented merit badges to several of the oldest employees in point of service, William Winter, Mrs. Maude Merritt, Carl Lindberg, Warren Sollenberger and David Lee. Mr. Winter accepted the merit badges on behalf of all the employees.

The award ceremony was enlivened with the strains of martial airs played by Phil Sapiro's band, and by vocal selections by Armand Girard, well-known radio artist. Chairman of the event was Bradford Melvin, prominent local attorney. A capable committee, consisting of C. R. Sessions, D. D. Howell, J. H. Laidman, Ward McSweeney, S. A. Lindsey, William Gunnison, Mrs. Carrie Chase, Marie Quartararo and Sam Gazzano, handled the arrangements for the ceremony.

One of the staff representatives receiving merit pin from Carl W. Flesher during the ceremony.

WHO'S WHO afloat and ashore

Principal Surveyor for the Pacific Coast

William B. Warren, former Principal Surveyor for the American Bureau of Shipping for the San Francisco Bay region, has been named Principal Surveyor for the Pacific Coast, succeeding Frank H. Evers who passed away last October after 42 years' service with the Bureau.

Mr. Warren came to the San Francisco office in 1937 from the Panama Canal Zone. He has been with the Bureau since 1926. He graduated from the University of Michigan in 1916 after completing his studies in Naval Architecture and Marine Engineering and was at various shipyards from that time until he joined the Bureau. He has served as surveyor in New York, Boston, the Canal Zone and San Francisco. He spent two years in the Bay City and then in July, 1939, went to the Ingalls Shipbuilding Co. at Pascagoula, Mississippi, leaving there to return to San Francisco in December, 1940. He was appointed Principal Surveyor for the Bay area in May, 1941. Although announced only recently, his appointment as Principal Surveyor for the Pacific Coast has been in effect since the first of this year.

William B. Warren, new principal surveyor of the Pacific Coast.

Now Serving in Navy

J. V. Jamison, 3rd, president and general manager of the Jamison Cold Storage Door Company since January 1, 1943, is now Lieutenant (j.g.) J. V. Jamison, 3rd, U. S. Navy, serving at the U. S. Naval Station at Hollywood, Florida. Mr. Jamison became associated with the company, headed by his father, J. V. Jamison, Jr., immediately upon his graduation from Yale University (where he had naval training)—and after a thorough apprenticeship in the various departments of the Jamison business became vice-president in 1941.

Kilsby and Graham Open S. F. Office

Kilsby and Graham, well-known Los Angeles firm of manufacturers' representatives, have announced the opening of a San Francisco office at 1201 Russ Building with Hoyt Jones named as manager for the Bay region.

In announcing the opening, the firm points out that Mr. Jones brings with him valuable experience in steel, oil production and refining and many related industries. His training started in 1923 with the National Supply Co. From there he went to manage the Bakersfield area for American Pipe and Steel Co. His last position before joining the Kilsby and Graham organization was as Los Angeles representative of the Pittsburgh Steel Co.

Hoyt Jones of Kilsby & Graham, San Francisco office.

The manufacturers he is now representing in the Bay Region include the Babcock and Wilcox Tube Co., Beaver Falls, Pa., seamless and electric welded steel tubing and pipe; the Duraloy Company, Scottdale, Pa., centrifugal cast tubular products and castings of high alloy steels; the Sivyer Steel Casting Co., Milwaukee, Wis., refinery headers; and the William F. Klemp Co. of Chicago, Ill. In addition to these, the Los Angeles office represents the Shenango-Penn Mold Co., Dover, Ohio, on centrifugally cast bronzes for shaft liners, sleeves, bushings, bearings, etc.

Pat McDonough, president and general manager, addresses crowd at Army-Navy "E" award ceremony.

Tank landing craft below, which earned McDonough Steel Co. the award.

McDonough Steel Company Receives "E" Award

High lighted by a citation from Under Secretary of War Robert Patterson, an impressive Army-Navy "E" ceremony held in Oakland on February 25 placed the McDonough Steel Company among the select little group, less than three per cent of the total war plants in the country, who have received the Army-Navy "E" award.

Lieut. Comdr. William E. Lehr, Senior Engineering officer of the Naval Landing Force Equipment depot at Albany, paid tribute to McDonough workers when he said, as he presented the "E" pennant: "You are taking part in the number one production job in the country in point of urgency . . . the landing craft which you are producing here are of the very highest importance in any landing operation."

P. W. McDonough, president of the company, accepted the award as, he said, "a challenge which we accept—to better our record of production."

Major Harry A. Mohler, Assistant to the Executive, Water Division, San Francisco Port of Embarkation, read Under Secretary Patterson's citation and addressed listening employees as "fellow-workers" of the armed forces. Major Mohler also presented token pins to Tony Ventura, Raymond Callistro and Leslie Rogers, who accepted them on behalf of all McDonough employees.

Lieut. Comdr. L. L. Lovett, Public Relations Officer of the Twelfth Naval District, acted as chairman of the day.

Captain Conway Given New Post with USMC, WSA

Captain Granvill[illegible] has been appointed a[illegible] ministrator of the M[illegible] sion. As associate dep[illegible] tor, he will report dir[illegible] Administrator Lewis W[illegible] act for him in his absen[illegible]

Brooks Equipment Executives

Roger Barnard, head of the Barnard Engineering Co., manufacturers of automatic fire sprinkler systems, has been elected president of the Brooks Equipment Company of California to fill the vacancy created by the recent death of S. H. Brooks. Mr. Brooks had been president of the corporation since its formation in

ROGER BARNARD

1942, and for years has been widely known as the original developer of the variable angle hinged joint using a ball and socket gear. He passed away in Los Angeles following a long illness.

Charles Neal, executive vice president and general manager of the Brooks Equipment Corporation of California, has been named president of Brooks Accessories Corporation, a position which had also been held by Mr. Brooks. Mr. Neal, who was formerly with the Pacific Fire Extinguisher Co., has been with the corporation since its beginning. His office is at 636 Potrero Avenue, San Francisco, and Mr. Barnard is at 736 E. Washington Boulevard, Los Angeles.

The firm's major activity is the engineering, developing and distribution of remote control equipment and assemblies.

CHARLES NEAL

G. E.'s New West Coast Public Relations Director

F. Lowell Garrison succeeds Paul C. Wilmore as Public Relations Representative for the General Electric Company in the Pacific Coast area,

F. LOWELL GARRISON

according to an announcement by R. S. Peare, manager of the company's Publicity Department, Schenectady. He will continue to maintain contacts with all media having offices located in the west, from his established headquarters on the eighth floor of the Russ Building in San Francisco, Calif.

Westinghouse's New Department Manager

William D. Turnbull, formerly of Pomona, California, who has been vice president and sales manager of the Pomona Pump Company of California since February, 1940, has been appointed manager of the Westinghouse Electric & Manufacturing Company's Agency and Specialties department.

Mr. Turnbull's appointment marks his return to Westinghouse after an absence of four years. He has been affiliated with the company's sales division since 1923 soon after completing a graduate students' course, and for many years served as manager of Mining and Petroleum Electrification Engineering, then as manager of the Machinery Electrification section. For his contributions to sales work during this period he was awarded the "Order of Merit," the highest honor bestowed on employees by the company.

Appointments at Bull & Roberts Firm

Bull & Roberts, consulting chemists of New York, announced that as of the first of the year, **Henry M. Shields** had been admitted to the firm as a partner and is acting as Laboratory Director. A. E. Roberts, co-founder of the company in 1903, and A. C. Purdy, a partner since 1927, continue as active partners.

The Company also announced that **Elliott S. Marshall,** who has been associated with the firm since 1928, had been placed in charge of Outside Service activities. In this capacity he supervises the servicing in the Port of New York of all vessels covered by Hall system boiler water conditioning contracts, as well as "gas-free" surveys conducted by the certified chemists of Bull & Roberts staff.

Recent Appointment

The Joshua Hendy Iron Works, Crocker-Wheeler Electric Division, announces the appointment of **R. D. Ulrey** as manager of their new Los Angeles, California, office.

This new office will provide coverage for Southern California, Arizona and New Mexico. By the establishment of this office, users of Crocker-Wheeler motors, generators and flexible couplings will be more promptly served in that area. The office is located in the Pacific Mutual Building, 523 West Sixth Street, Los Angeles.

Mr Ulrey is well known in that area as a motor and generator application specialist, having been associated with U. S. Electrical Motors of that city.

New Director of Public Relations Of U. S. Maritime Commission

Robert W. Horton has been named as Director of Public Relations of the U. S. Maritime Comission and the War Shipping Administration, succeeding Mark O'Dea, resigned, the agencies recently announced.

Mr. Horton was formerly with the Maritime Commission and has lately been Director of Information, Department of Interior. He was loaned by the Maritime Commission to the National Defense Advisory Commission in 1940, and subsequently became Director of Information of the Office of Emergency Management, and resigned to become Deputy Administrator of the Office of Price Administration.

Kilsby & Graham Represent "Duraloy"

The Duraloy Company of Scottdale, Pa., has appointed the firm of Kilsby & Graham of Los Angeles and San Francisco as representatives for the "Duraspun" line of chrome-iron, chrome-nickel and nickel-chrome centrifugal castings, as well as the "Duraloy" special industrial alloy.

Consolidated Steel Promotes Chas. W. Lee

The Consolidated Steel Corporation, Ltd., Los Angeles, announces the promotion of Charles W. Lee to the position of General Superintendent of its Wilmington, Pico, and Craig yards.

Link-Belt Company Pacific Division Wins Army-Navy Award

A ceremony was held on March 13, at the San Francisco plant of the Link-Belt Company, when the Army-Navy "E" Award was presented to the employees and management.

Renewal of Army-Navy "E" Award

The Navy Board of Production Awards recently granted a renewal of the Army-Navy "E" Award to the Centrifugal Casting Division of the Shenango-Penn Mold Company, Dover, Ohio.

A large part of the current production of the company is in the form of centrifugal bronze propeller shaft sleeves and stern tube bearings and other vital parts for Victory ships of the Maritime Commission and warships of the U. S. Navy.

Joins Enterprise Staff

Gerald J. Brusher recently joined the sales staff of Enterprise Engine & Foundry Co., bringing with him 34 years experience in marine engine business. He is located in San Francisco.

Transferred

William R. Northlich who has been transferred from the Washington, D. C., office of Owens-Corning Fiberglas Corporation to the Toledo, Ohio, general offices where he is serving as assistant to the general sales manager.

Champion Welderette

Vera Andersan, 20-year-old welderette at Ingalls Shipbuilding Corporation, Pascagoula, Mississippi, successfully defended her title as the world's champion when she defeated the challenger, Mrs. Edna Slocum of Moore Dry Dack, Oakland, California.

Obituaries

Captain Anderson, Beloved Shipping Figure, Passes

Captain Alfred E. Anderson, 73, outstanding and greatly beloved figure of the San Francisco waterfront, died on March 9 of a circulatory ailment at his residence on Sacramento Street. He had been connected with shipping in the Bay Area since 1875.

Outstanding among Captain Anderson's achievements were the building of the Delta King and the Delta Queen, magnificent river passenger and cargo liners that formerly ran from San Francisco to Sacramento, but now have passed to Navy control.

Captain Anderson, son of Captain Nels Anderson, who sailed fast ships in California's early days, was chairman of the board of The River Lines and president of the California Transportation Company.

Standard Oil Executive Passes

Herman J. Esselborn, assistant general manager of the marine department, Standard Oil Company of New Jersey, died in Municipal Hospital, Tampa, Florida, on March 7, as the result of a heart attack. He had been ill for several months.

Mr. Esselborn had completed nearly 39 years of service with the company, having entered its foreign shipping department in 1905.

On January 1, 1942, he was appointed as assistant general manager of the company's marine department which post he held until his death.

Promotion of Executives At Calship

California Shipbuilding Corporation, which in its first three years of operation on Terminal Island has built and delivered well over 325 merchant ships to the U. S. Maritime Commission, now is completing its change-over to full yard production of Victory ships. The yard holds contracts for the construction well into next year.

The California Shipbuilding Corporation officers include S. D. Bechtel, chairman of the board; John A. McCone, president; and J. K. Doolan, vice president

C & H Supply Co.'s New Offices

The C & H Supply Company, distributors of marine and industrial products, announces the opening of offices at 122 New Montgomery Street, San Francisco, under the management of W. L. Powell.

Among the firms represented by the San Francisco office of the company are: The Mechanics Universal Joint Company of Rockford, Illinois, manufacturers of marine roller bearing type universal joints; The Sherwin Williams Company of Cleveland, Ohio, who manufacture a chromatic gasket material, which is in wide use in ventilation ducts in shipyards throughout the nation; and Sperry Products, Inc., Hoboken, New Jersey, manufacturers of the Sperry exactor hydraulic control.

Headquarters of the company are at 2723 First Avenue, South, Seattle, Washington, where the firm represents a large list of marine, aircraft and general industrial products. Officers of the company are: Phil Coffer, president, and W. K. Houston, vice-president.

Yuba Manufacturing Company "E" Award

The Benicia, California, plant of the Yuba Manufacturing Company was presented with the Army-Navy "E" award on March 30, in recognition of its outstanding war production record.

Presentation of the pennant was made by Colonel K. B. Harmond, chief of the Army ordnance, headquarters in San Francisco, and the pennant was accepted on behalf of the company and its employees by Charles W. Slack, senior vice-president.

Former Employees of Newport News Notice

The Apprentice Alumni Association of the Newport News Shipbuilding and Dry Dock Company will celebrate the Golden Anniversary of the first Apprentice graduate in May or June of this year.

The Association is making preliminary plans for a radio broadcast and elaborate printed program. One section of this program will consist of the names of all Apprentice graduates, together with what they are now doing and where they are located. Graduates who have left this shipyard and are now working elsewhere, please contact the secretary of the Apprentice Alumni Association; this applies to all graduates, whether they are members of the Association or not, in order to complete the information desired.

Invincible Tool Company Appointment

J. M. Costello Supply Company, of Los Angeles Harbor, has just been appointed Marine Sales Representative for the Invincible Tool Company of Pittsburgh, Pa., manufacturers of drill tool attachments. This company has also been recently designated as representative for Socony Marine Paints.

New Sperry Marine Manager

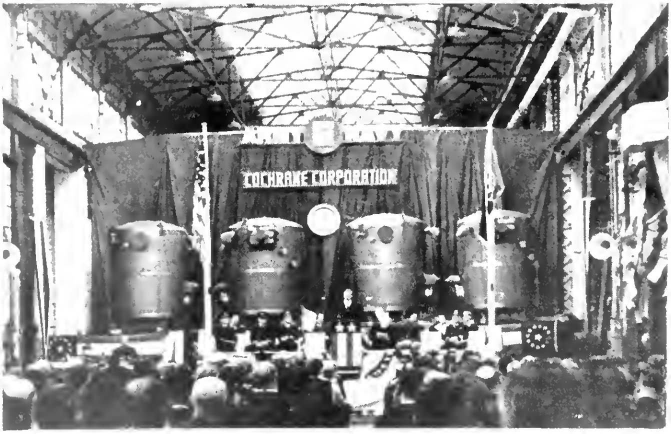
F. S. Hodgman, Lieutenant Commander U. S. N. R., retired, assistant chief engineer of the Sperry Gyroscope Company, has been named manager of the Marine Division, it has been announced by R. E. Gillmor, president. The new Division, which will absorb the Company's Sperry plant in Brooklyn, has been established to develop a unit for the efficient manufacture of all products for naval and merchant ships, other than ordnance equipment, and for initiation of new developments and product improvements in the marine field.

Consulting Engineer Resumes Private Practice

A change of status and address of Warren H. McBryde, consulting engineer, formerly with the Transportation Corps of the War Department, Washington, D. C., was announced On Mach 1, he resumed private practice as consulting engineer with offices located in the Financial Center Bldg., in San Francisco; with headquarters at the Waldorf-Astoria in New York; and, when in Washington, D. C., at 2101 Connecticut Ave.

Cochrane Gets "E" Flag

The award of the Army-Navy "E" for excellence in production records was presented in February to the Cochrane Corporation of Philadelphia, Pa., plant. High officials of the Army and Navy took part in the program, which was attended by the employees. Among those who took part in the ceremony were: Commander Floyd B. Schultz, U. S. N., who presented the flag; Joseph Tapley of the employees committee; Major Victor W. Smith, U. S. A., who presented Army-Navy pins; and Percy S. Lyon, president and general manager of the corporation.



Deaerators Exhibited at Ceremony

Four marine deaerators ready for shipment on the day the Cochrane Corporation received the Army-Navy Production Award made a striking background for the presentation ceremony, as the flat car on which they were bolted merely halted on the tracks through the assembly shop and the speakers platform arranged in front of it.

Suit for Smith Cove Purchase Proceedings Under Way

Proceedings in the Government condemnation suit for purchase of Smith Cove Piers 40 and 41 at Seattle were heard by a jury in the United States District Court in Seattle, with Judge John C. Bowen presiding. The Navy has already taken over the property for the Naval Supply Depot. The trial, already started, is expected to take about four weeks, after which the jury will decide the compensation due the Port of Seattle from the Government.

The Navy took title for the piers from the Port on February 2, 1942, including 180 acres at Smith Cove from various property owners for the depot.

Frank P. Keenan, head of the lands division of the Department of Justice, and Leo W. Stewart, lands division special attorney, represented the Government in the action. The port was represented by Ray Dumett.

Appropriation Granted to Port of Everett

The Port of Everett has been awarded $233,500 by a Federal jury for 23 acres of filled-in waterfront property protected by a breakwater, which has been taken over by the U. S. Navy. The sum includes all buildings on the property.

The verdict followed a two-day condemnation trial in United States District Judge John C. Bowen's court. The Everett Pacific Shipbuilding Company took possession of the property in February, 1942, under a lease, and the Navy took title the following October.

Marine Exchange Activities

by M. A. Cremer, Manager

New Members

Applications for membership received during the past month included:

American Dredging Company
Associated Dredging Company
Healy Tibbetts Construction Company
L. S. Case Company
Dahl-Beck Electric Company
Marinship Corporation

Bay Area Maritime Committee

One of the objectives of the Bay Area Maritime Committee has been the full use of all cargo-handling facilities in the area.

This applied particularly to the Port of Stockton, where until recently no cargo movement of any consequence was possible, principally because the sheds were being used as warehouses by a Government agency.

Today ocean-going vessels are call-

ing direct at Stockton. In addition, cargo is being barged between Stockton and the lower bay.

Another improvement is the removal of empty drums from Pier 92 at San Francisco, where their presence interfered with the proper use of the pier.

Another point being cleared up is the Parr Richmond Terminal No. 3, where about 20,000 empty drums were being stored. About three-fourths of these have been removed.

The committee has encouraged the building or delivery in the area of more tugs and lighters. To date several additional tugs have been received.

Among projects due to receive more attention are the removal of Horseshoe Bend from the Napa River and the improvement of dredging practice in the channel of upper Suisun Bay.

Foreign Trade Zone

The submission by the State Harbor Board of two sites for a foreign trade zone, namely, at Mission Rock and Pier 92, has evoked much favorable comment.

The executive secretary of the Foreign Trade Zones Board of Washington, D. C., is expected to visit San Francisco in the late spring or summer to confer with Harbor Board officials to determine which of the two sites shall be selected.

In the meantime, it appears that the Harbor Board will receive a clear title to Mission Rock. Senator Hiram Johnson has informed the Exchange that the Navy has agreed to turn over to the State its title to the pinnacles when it receives assurance from the State that Mission Rock will be developed.

World Trade Center

The trustees of the World Trade Center, Inc., have elected the following officers:

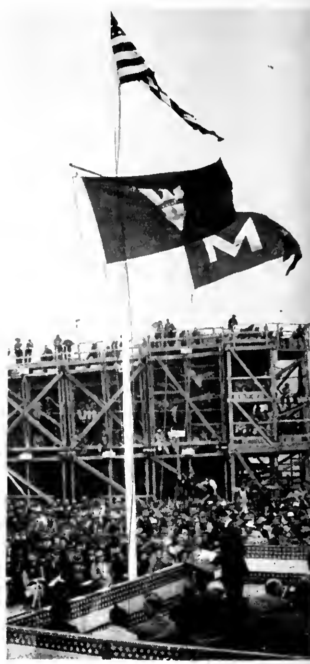
Leland W. Cutler, President
O. C. Hansen, Vice President
Leland M. Kaiser, Tresaurer
M. A. Cremer, Secretary

It was decided by the trustees to raise a preliminary fund of $25,000 to prepare plans to acquire property, to construct buildings, to publish a brochure to arouse interest in the project, and to arrive at plans for financing the venture.

Already prospective tenants for three and possibly four buildings have appeared voluntarily. Inquiries among Eastern manufacturers indicate a substantial interest in office and display space.

State and Federal officials have encouraged a hope for public funds to aid substantially in meeting planning costs.

The "M" burgee of the U. S. Maritime Commission being awarded to Belair Shipyard, South San Francisco, for an exceptional record in construction of concrete barges.



Pacific MARINE REVIEW

MAY 1944

Pacific Marine Review

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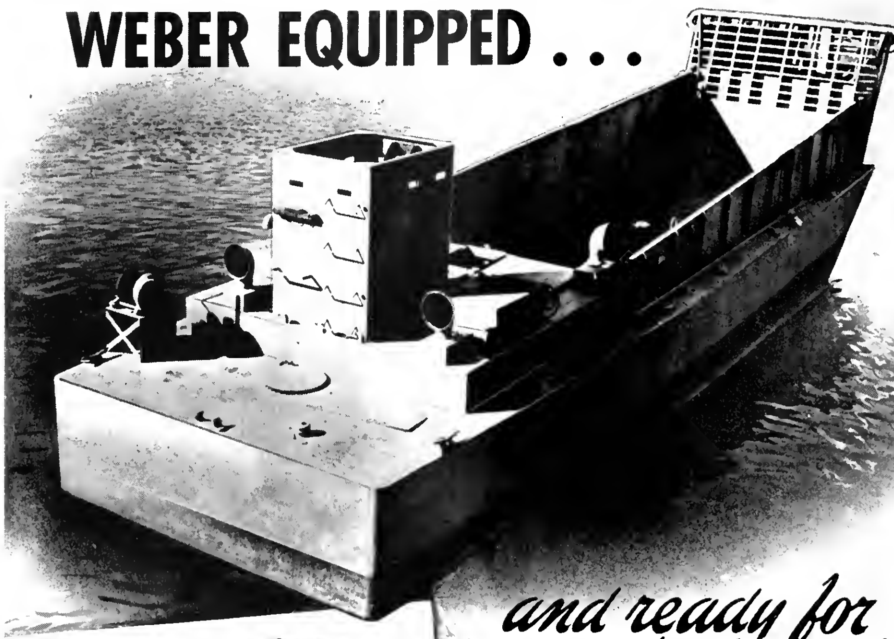
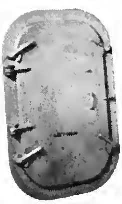
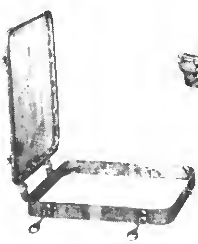
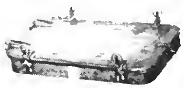








Renegotiation of Liberty Fees

Pacific MARINE REVIEW

The U. S. Maritime Commission has recently released some very interesting figures covering the renegotiation of Liberty ship contracts and making public the fees actually earned as net profits by the contractors.

In these negotiations the Oregon Shipbuilding Corporation contracts were first dealt with, and the method and results obtained there were used to set a standard basis for dealing with other yards.

The case of the Oregon Shipbuilding Corporation covered the first five contracts awarded to that corporation, aggregating 181 Liberty cargo ships completed prior to May 4, 1943. The renegotiation agreement as signed finds that this corporation has received or accumulated $6,322,954.08 in net excess profits, after deducting $163,960.60 for items adjusted in renegotiation. This amount, less credit for taxes paid on unreceived income, if any, is to be credited against fees which the contractor has earned since May 4, 1943, and not yet received.

Oregon earned $23,958,564.68 in fees under the terms of its contracts. The renegotiation procedure reduced this to $17,471,650.00, or $96,528.45 on each of the 181 vessels. From this was deducted $1,267,000.00, representing disallowances of items claimed by the contractor, leaving $16,204,650.00 income after renegotiation but before taxes. The net income of Oregon for its services in building 181 ships, after renegotiation and after estimated taxes are deducted, amounts to $4,537,302.00, or approximately $25,000 per ship, or one and one-half per cent of the cost of each ship.

The Liberty ship construction contracts all contained an incentive principle based upon the payment to a contractor of a normal fee for his services in building the ship, with additions or subtractions dependent upon variation from the man-hour standard set in the contract.

The original normal fee of $110,000 per vessel could reach a maximum of $140,000 or a minimum of $60,000. Subsequent contracts have successively reduced the maximum to $60,000 and the minimum to $20,000, respectively, without in any way doing violence to the integrity of the contract or destroying the incentive principle which has contributed such a great stimulus to production, the Maritime Commission said.

The Commission has periodically adjusted the maximum fee payable to this group of contractors. First, to $120,000 per ship during the first fifteen-month period, $100,000 per ship for the next six months and $80,000 for the following six months, and $60,000 for all ships delivered thereafter. The savings that have resulted from the reduction in the maximum fees substantially exceed the total of all fees paid to all Maritime Commission shipbuilders.

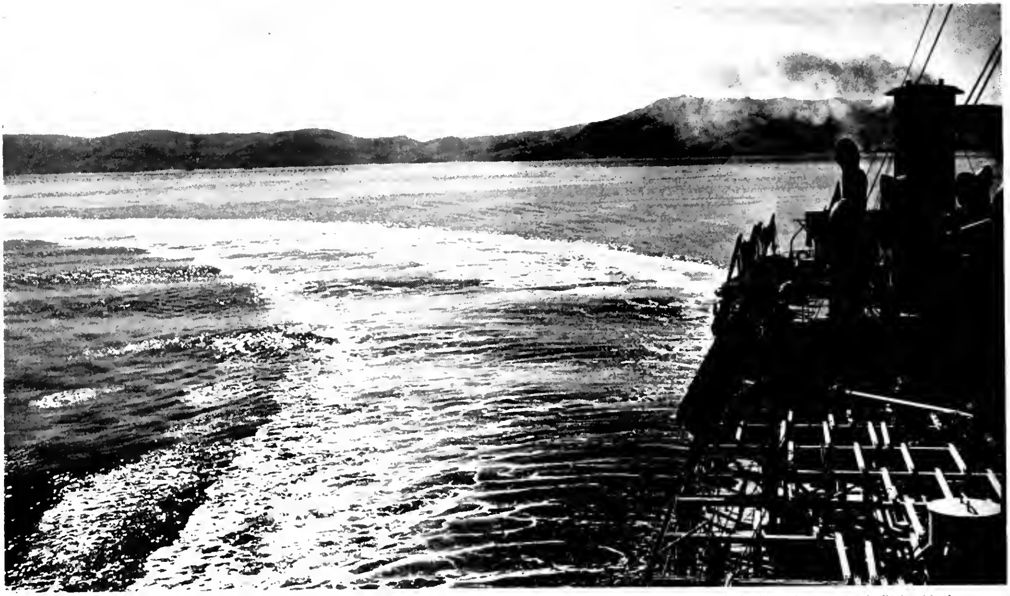
The formula as established in the Oregon case sets up four factors, based upon the actual performance record, which modify the maximum amount payable upon a ship. It continues the incentive features embodied in the shipbuilding contracts, is consistent with the Commission's action of negotiating reduced fees in the award of subsequent contracts to these yards, and yet accomplishes the purpose of the Renegotiation Act by eliminating excessive profits.

For each one of the four respective periods, the yards are rated according to their actual performance record. These ratings are established on the basis of: (1) The lowest number of man-hours actually used in the construction of each vessel, (2) The lowest dollar cost of each vessel, (3) The largest number of ships delivered during the period from each shipway in the yard, and (4) The lowest dollar investment of Government facility in the yard charged to each vessel. By taking these four ratings and combining them for each yard and applying the result against the perfect rating of 100 per cent the actual rating of each yard is obtained. This percentage is then applied to the difference between the maximum and the minimum fee for each given period and this establishes the actual fee to be paid to the yard for each vessel delivered in that period.

Where special circumstances make it necessary, such as where a part of the Liberty ship program has been temporarily set aside in order to construct special types of ships, these ratings are correspondingly qualified.

Speed was the essence at all times in connection with the construction of the Liberty ships, and in the renegotiation proceedings. The time factor has been considered the most important element involved.

The incentive system established under the Liberty ship contracts created keen rivalry among shipbuilders to reduce man-hours and cost. This competition reduced the man-hours from the first estimates of 635,900 per ship to an average of 520,000, and in one case to below 350,000. In terms of money this has reduced the cost of Liberty ships to approximately $157 per deadweight ton.



Leaving a broad wake astern, S. S. Mission Purisima makes a sharp turn. She is first of a fleet of "mission" tankers to be built by Marinship, and is the yard's tenth T-2. The first nine were delivered to the Navy.

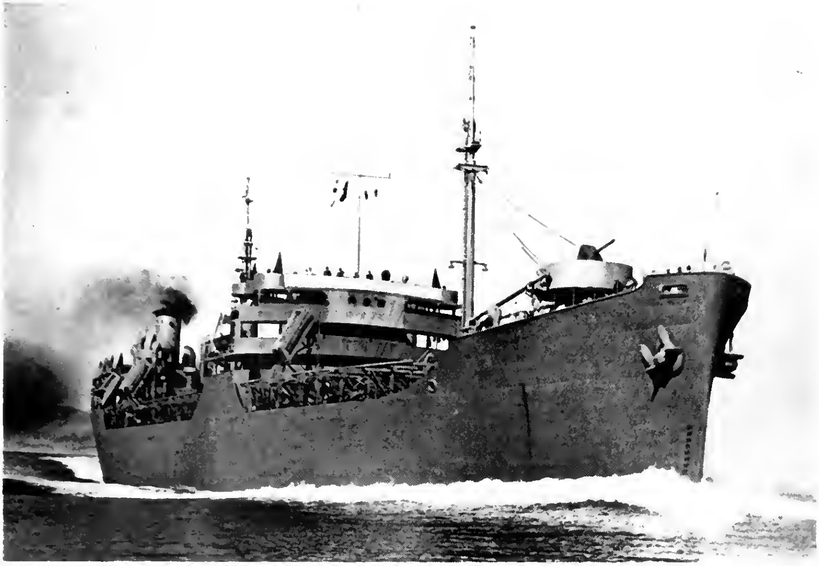
(All photos courtesy Marinship)

This unusual shot shows the bow of one of the "mission" tankers plowing through the waters of San Francisco Bay.

MARINSHIP *Special*

MANY T-2 tankers are being built by the U. S. Maritime Commission at various American yards. These tankers are of the single screw U. S. M. C. design, which originally called for 12,000 shp in geared turbines and a sustained sea speed of 16½ knots. As now being built in large numbers, they are powered with steam turbo-electric drive to avoid the bottleneck delay in the manufacture of large helical gearing. The most available power plant was a combination giving 6000 normal shaft horsepower, and the bulk of the T-2 tankers now under construction are being powered with that capacity steam-electric drive, which gives this tanker hull a good turn of speed, as tankers go.

One of the new high-speed tankers shown during trials in San Francisco Bay.



However, the first group of tankers being built at Marinship are powered with steam-electric machinery that has a normal rating of 9000 shp and a maximum continuous operation rating of 10,000 shp. Trial results of these vessels are not published, but they are sufficient to allow the builders to make the claim that these are "the fastest commercial tankers being built today."

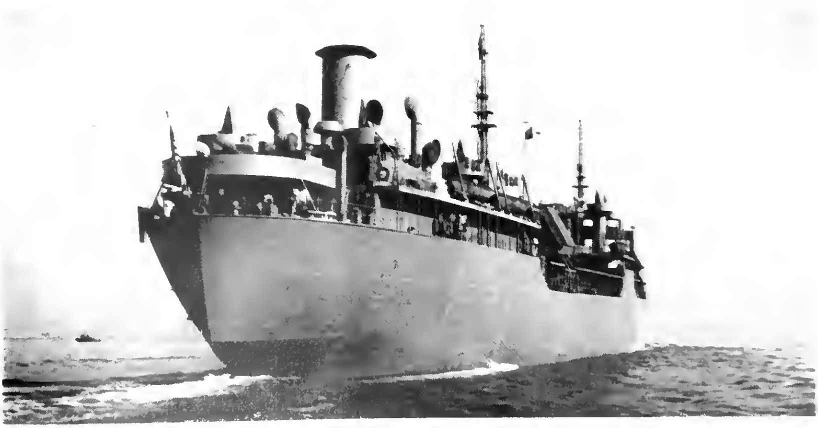
Since we have frequently published complete details of T-2 tankers, we shall confine this article to a short description of the power plant on these ships, and to mention of the subcontractors and vendors to whom Marinship gives credit for helpful co-operation in making the construction record which, early in April, brought that yard the U. S. M. C. Tanker-Champion Flag.

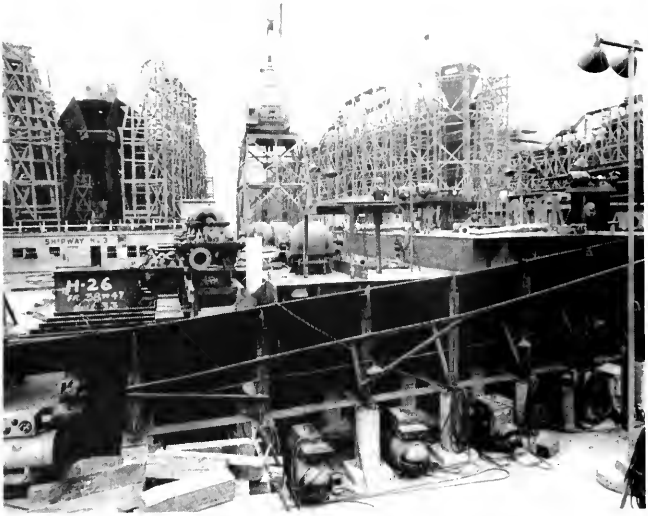
T-2 *Tankers*

The steam is generated in two Babcock & Wilcox design two-drum water-tube type oil-burning boilers operating under forced draft and having incorporated superheater and economizer. The heating surfaces in each boiler, including water walls, are 6350 sf for the boiler, 675 sf for the superheater, and 1680 sf for the economizer. Furnace volume is 573 cf.

Steam conditions are 600 psi and 825° F. at superheater outlet, and each boiler has a capacity to produce 43,000 pounds of superheated steam and 4500 pounds of desuperheated

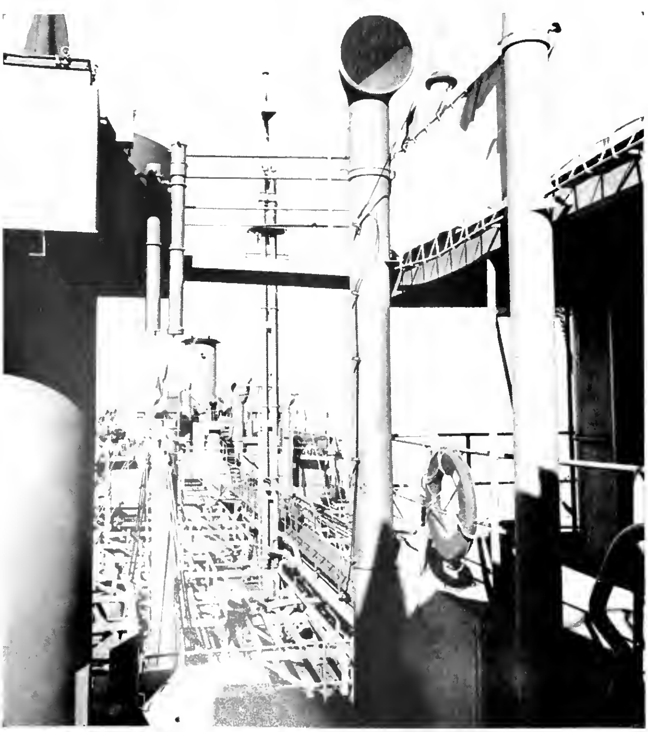
The Mission Purisima pulls away from her berth at the outfitting docks. The 16,500-ton tanker set a new construction record for the tenth T-2 built in any shipyard with a total elapsed time of 166 days from keel-laying to delivery.





Above: To save time and labor of machinists at Marinship, power machinery unit is preassembled and placed into the ships in a single compact piece.

Below: View aft from the midship deckhouse of S. S. Mission Purisima shows auxiliary cargo space, mainmast and poop deck, with king post prominent in the foreground.



steam per hour. These boilers operate with Bailey type feed-water regulators and under Bailey automatic combustion controls.

Steam arrives at the throttle of the propulsion turbine at 590 psi and 815° F. temperature. This turbine is a General Electric 14-stage machine, the first wheel being fitted with a double row of Curtis blades and all the other rows being fitted with Rateau blades. At its normal rating, this turbine turns 3600 rpm with 1¼ inch absolute pressure at the exhaust to produce 6890-kw electric energy of 3-phase, 60-cycle alternating current at 3500 volts and on unity power factor.

The turbine is directly connected to the General Electric generator, and both are capable of running continuously at a speed of 3715 rpm for a maximum rating of 7650 kw, 3 phase, 61.9 cycles, 3610 volts, at unity power factor. The set will operate at 110 per cent normal rating speed, or 3860 rpm.

This generator supplies current directly through suitable control apparatus to the propulsion motors, of which there are two types in these Marinship tankers. The first type is a 70-pole motor with a normal rating of 9000 shp at 103 rpm, and the second type is a 60-pole motor with the same rating at 120 rpm. Both of these motors will operate continuously at 10,000 shp output.

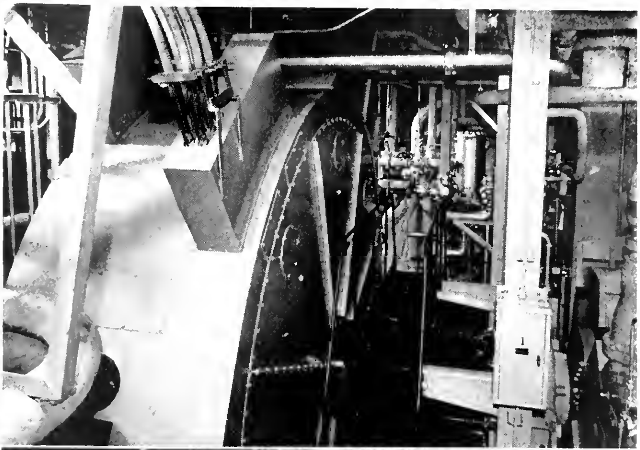
The generator and the motor each have a separate closed system of air ventilation fitted with surface air coolers, and their operation, without heating at the above ratings, depends on a flow through these coolers of 165 gpm (generator) and 175 gpm (motor) of sea water at an inlet temperature not exceeding 85° F.

The propulsion motor is located on the lower flat of the machinery space and is directly connected to the propeller shaft. The two boilers are on the upper flat directly above the motor, and the turbo-generator set is on the upper flat forward of the boilers on the port side. Abreast of the main generator set and on the starboard side of the upper flat, two auxiliary turbo-generator sets are installed. These sets are each composed of a General Electric turbine running 5645 rpm, connected through a helical single-reduction gear set to three generators in line, running 1200 rpm. The generators on each set are: a 400-kw, 450-volt auxiliary generator for lighting and auxiliary power services; an 85-kw, 110-v.d.c. exciter for field

current for the main propulsion generator and the main propulsion motor; and a 55-kw. 120-volt d.c. exciter for supplying power to the excitation bus for all auxiliary motors.

The attached auxiliary motor capacity for machinery spaces, including cargo pump motors, is on the order of 1300 hp.

The main propulsion turbines exhaust directly into a condenser mounted athwartship directly beneath the turbine. This condenser is

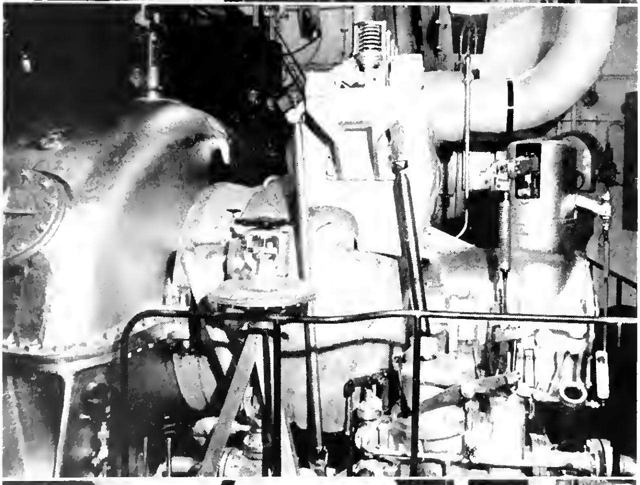


View of the main propulsion motor, showing main feeder lines (upper left), which carry 3600 volts from steam turbine driven generators.

served by condensate pumps and by twin air ejector with inter and after condensers. The condensate is pumped through a drain cooler, where it picks up some heat, and from thence through a first stage heater and up to the combined deaerating heater and hot well of the Elliot type, located in the upper fidley and forming a positive suction for the main feed pumps.

Marinship credit subcontractors with much of their success in producing these fine, speedy tankers. There are 15 of these, of whom the first four hold contracts direct with U. S. Maritime Commission and the other 11 are contracting with Marinship. They are:

National Joinery Company, with a plant at San Rafael, 10 miles from the shipyard and six trucking units. This firm takes charge of all joiner work.



View of the main steam turbine, showing steam inlet (upper right) and automatic operating equipment for the unit (center).

Turner Resilient Floors, Inc., deck coverings.

Selby Battersby & Co., plastic armor.

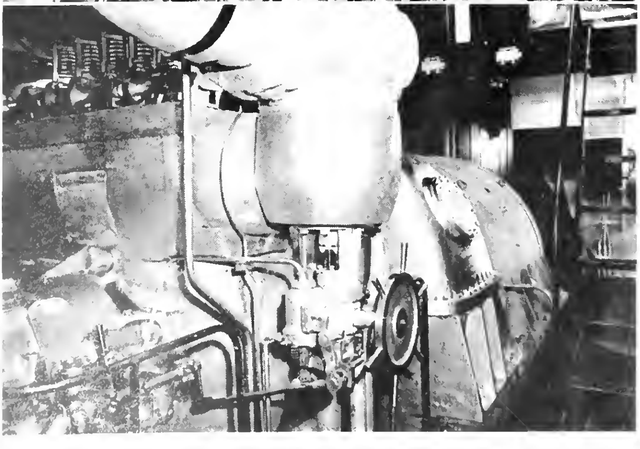
Robert F. Smith Company, bituminous enameling.

Plant Rubber & Asbestos Works, heat insulation.

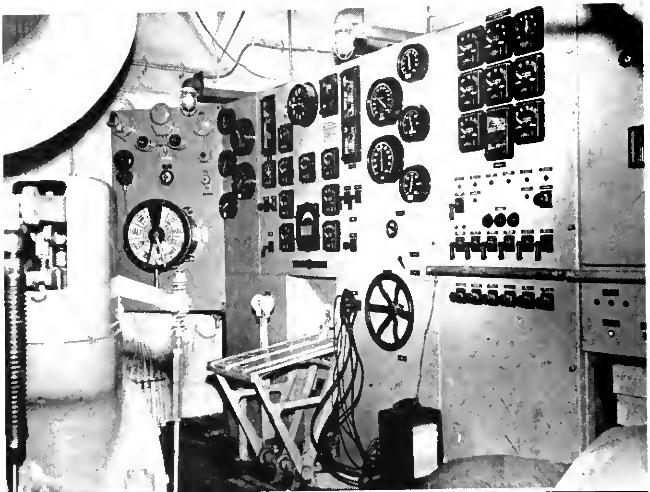
Ralph E. Manns Company, refrigeration, telemotor and vent gage piping.

J. M. J. Firebrick Construction Company, boiler brick work.

Pacific Erecting Company, boiler erection.



The main steam turbine from portside, looking starboard and aft, showing the throttle wheel in center foreground.



Upper: Partial view of main switchboard, showing main turbo generator gages and controls, and also engine order telegraph.

Lower: View in generator room, looking outboard aft at upper deck level, showing 10-ton overhead traveling crane.

Armstrong Cork Company, refrigerator boxes and fiber glass insulation.

Reeder-Thum-Mancini Co., plumbing systems.

Hall Laboratories, Inc., boiler and feed water conditioning.

Industrial X-Ray Engineers, inspection of pipe welds and piping.

Malott & Peterson, concrete and mastic floors in refrigeration boxes.

Rigney Tile Company, ceramic tiling.

The vendors who supply equipment, materials and machinery for these ships represent contributions from all parts of the United States.

There are many piping systems on a tanker, and this and its valves, fittings and pipe attachments were supplied by some 125 manufacturers with plants in 25 states of the Union. Here are a few samples:

Associated Valve and Engineering Co., Illinois; Darling Valve & Mfg. Company, Pennsylvania; Edward Valve & Mfg. Company, Indiana; Crane Company, Washington, D. C.; Crosby Steam Gage & Valve Company, New York; Farris Engineering Co., New Jersey; Lunkenheimer Company, Ohio; Wm. Powell Company, Ohio; Walworth Co. Inc., New York; W-K-M Company Inc., Texas; American Machinery Corporation, Florida; Atwood & Morrill Co., Massachusetts; C. H. Dutten & Co., Michigan; Los Angeles Steel Castings Co., California; Miller Metal Products Company Inc., Maryland; Manning, Maxwell & Moore, Connecticut; The Southeastern Foundries, Inc., Georgia; Campbell Oil Tool Co., West Virginia; Worden-Allen Company, Wisconsin; J. C. Muller Inc., Virginia; Armco Drainage & Metal Products Inc., Colorado; Zallia Bros. & Johnson, Delaware; Tube Turns Inc., Kentucky; Tennent Steel Casting Company, Washington; Stockton Pipe Fittings Co., Alabama; A. M. Byers Company, Pennsylvania; Chase Brass & Copper Company, Connecticut; Steel Pipe & Tanker Co., Oregon; American Brass Company and Phelps Dodge Copper Products Corp., both of Washington, D. C.; and The National Tube Company, Pennsylvania.

Pump manufacturers represented in the machinery installation include: Goulds Pumps Inc., Quimby Pumps Co. Inc., Dayton-Dowd Co., National Transit Pump & Machine Company, Joshua Hendy Iron Works (Pomona Pump Division), Ingersoll Rand Co., and Wilson Snyder Mfg. Co.

Deck machinery was supplied by Hesse-Ersted Iron Works of Portland, Oregon, who furnished the windlasses and some of the winches; and by American Hoist & Derrick of St. Paul, Minnesota, who furnished many of the winches.

The Sperry Gyroscope Company supplied complete gyro-compass equipment with steering and bearing repeaters, course recorders, gyropilots, revolution and helm indicator systems, and control panels. Magnetic compasses, binnacles and electric sounding machines came from Kelvin & Wilfred O. White Co. of Boston, Massachusetts.

Deck fittings, such as padeyes, cleats, bollards, hooks, turnbuckles, lashing rings, wire rope and hemp cordage, came from a couple of dozen firms whose plants span the nation from Portland, Maine, to Los Angeles, California, and from Florida to Seattle.

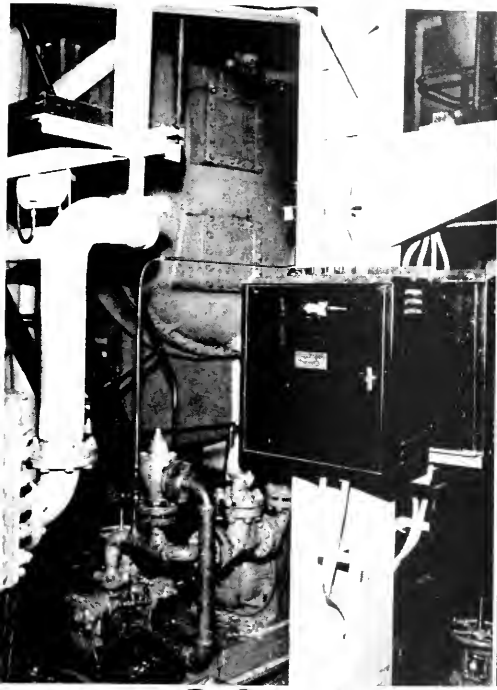
ON THE FACING PAGE:

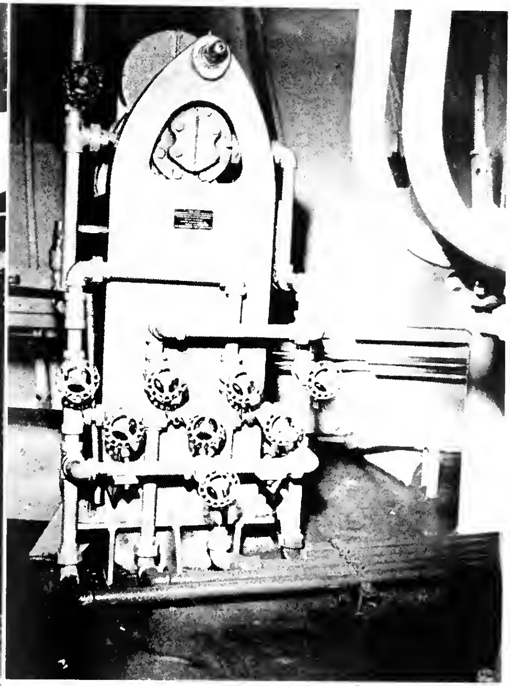
Upper left: From starboard looking forward to port, showing main condenser in background.

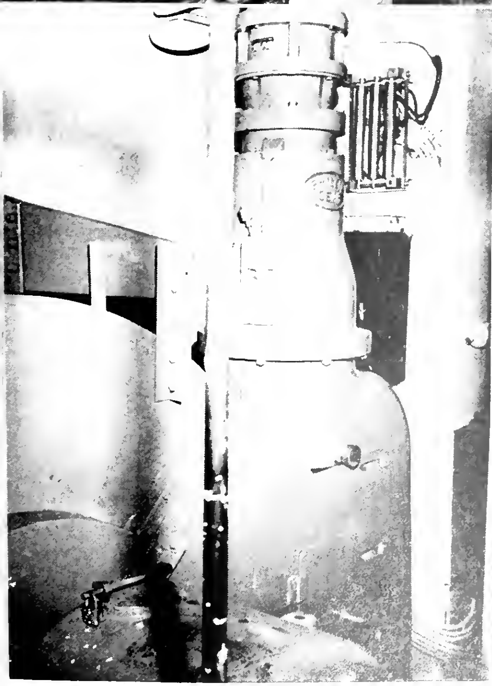
Upper right: Hand steering gear pump, looking to starboard.

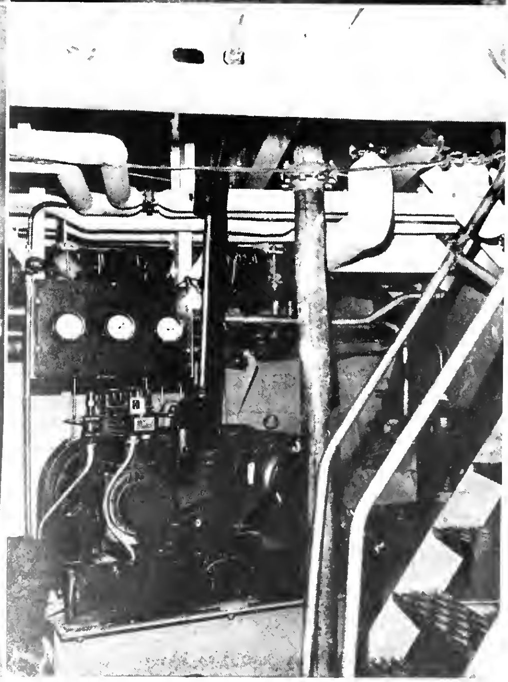
Lower left: Shaft turning gear, looking outboard.

Lower right: Carrier refrigeration compressor, showing cork insulation, partly installed), gage board, air receiver, replenishing tank, and piping arrangement in steering gear room aft, port side, looking outboard.

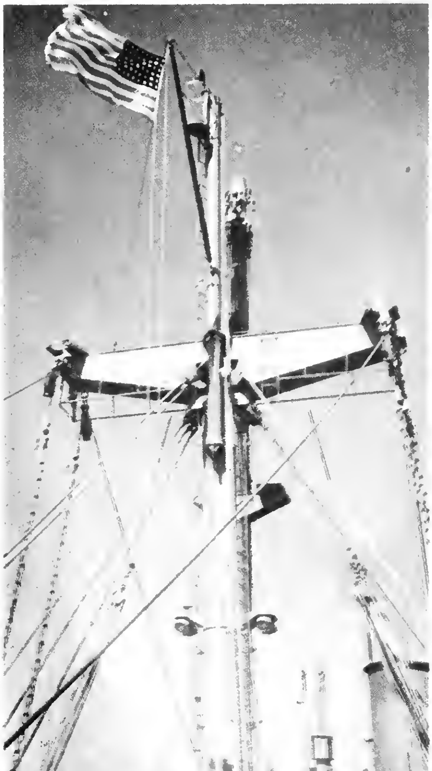








S. S. Chino Victory off the California coast.



Old Glory waves from the mast of the new vessel.

Calship's FIRST VICTORY SHIP

China Victory Makes Clean Sweep

THE MARITIME Commission has recently made public much of the detail of the Victory type cargo vessel, which is taking the place of the Liberty type, and of which several have now been delivered from Pacific Coast yards. The following description of this type is taken from two addresses before the Metropolitan Section of the Society of Naval Architects and Marine Engineers at

New York on March 24. The first paper was on "Victory Ship Design," by James L. Bates, Director of Technical Division, U. S. M. C., and the second on "Victory Ship Engineering," by Arthur C. Rhon, chief engineer, Technical Division, U. S. M. C.

The bases of the Victory design were a hull that would have a deadweight capacity of not less than 10,500 tons, and machinery of sufficient power to maintain a service sea speed of not less than 15 knots with that hull in full loaded condition.

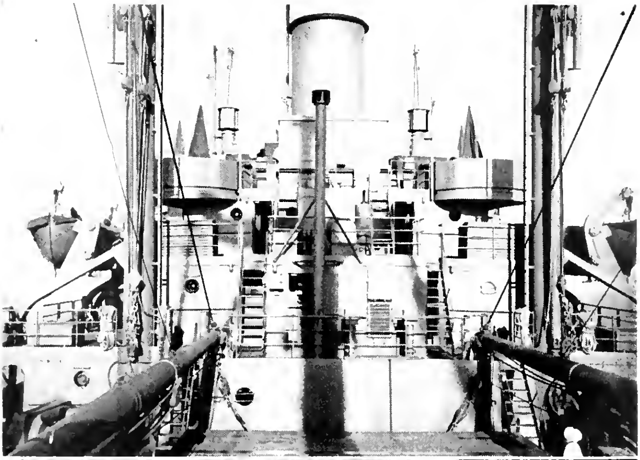
Preliminary calculations indicated the horsepower necessary as in the range of 5600 to 6000.

Design characteristics as finally accepted are shown in the table herewith, and the arrangement of spaces is according to the plans and inboard profile shown. It will be noted in the table of characteristics that there are two alphabetical classes of the Victory ship type, the AP-2 and the AP-3. The only difference is in the propulsion machinery.

Reason for the 8500-shaft-horsepower turbine in the AP-3 is that the Commission had built up a large capacity in C-3 type turbines of this rating and these turbines were being produced faster than the C-3's were being built, hence these turbines were available.

The engineering department of the Commission, in designing the "Victory" power plants and auxiliary machinery, have maintained a rather high degree of standardization by specifying practically all engine room auxiliaries to be identical in all of these ships, and all turbines and gears of same rating to be of identical over all dimensions and to fit the same foundations. A number of engine room auxiliaries such as force draft fans, feed pumps and fuel oil pumps, are steam drive.

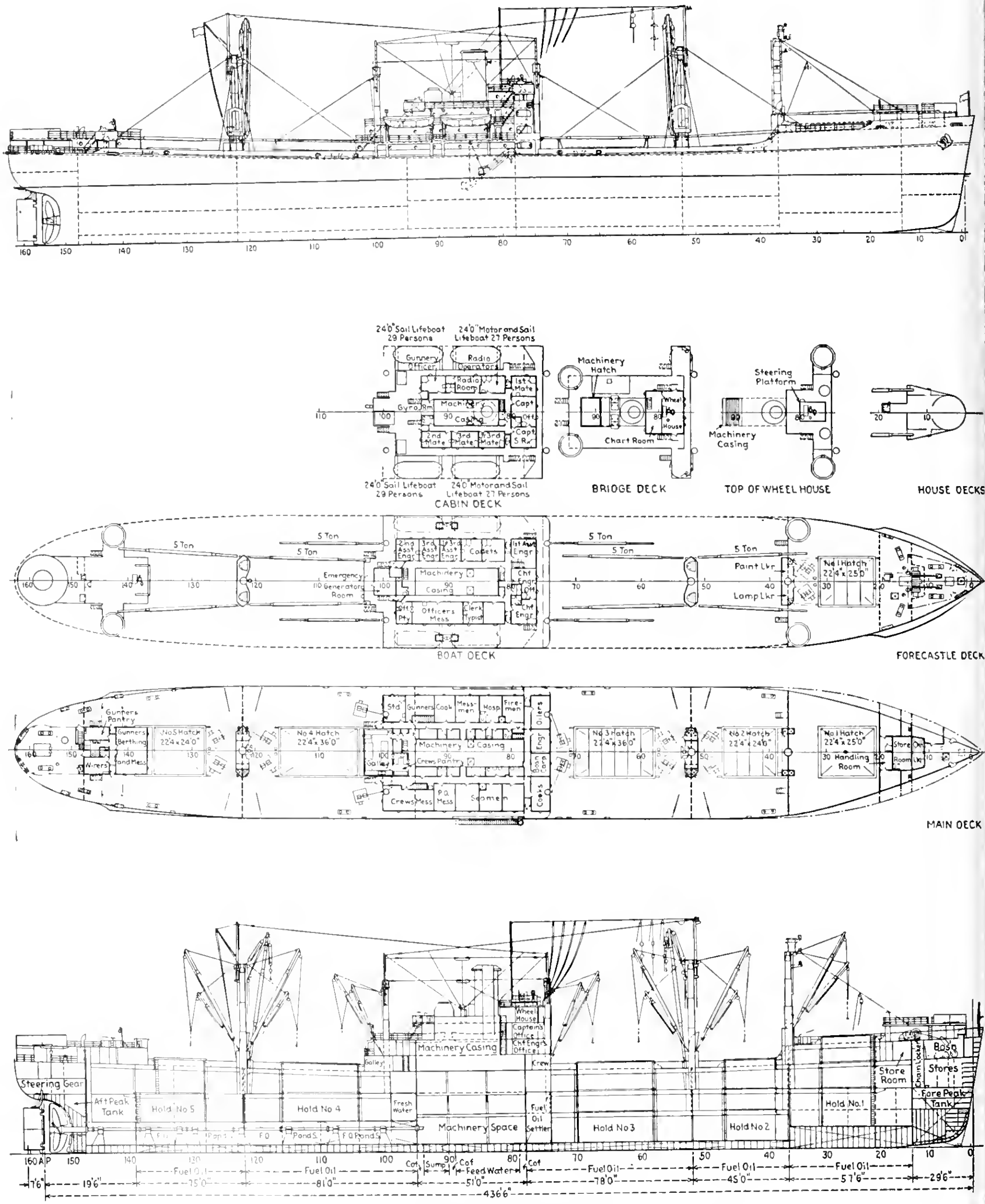
The steam condition is the same as on the standard C-type steamers, 440-psi throttle, 740° F. and $28\frac{1}{2}$ inches vacuum. There is only one



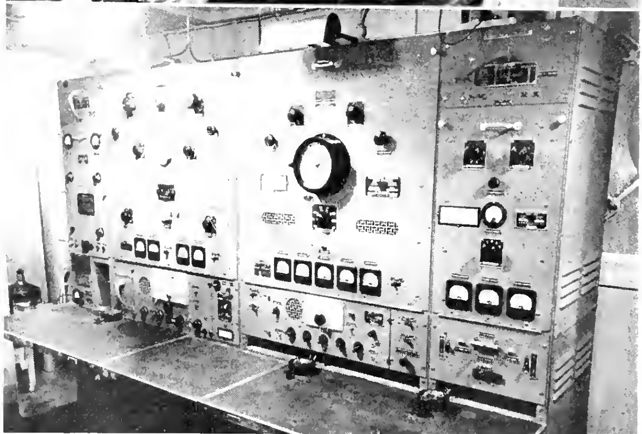
Top of page: Deck view showing bridge, forward looking aft.

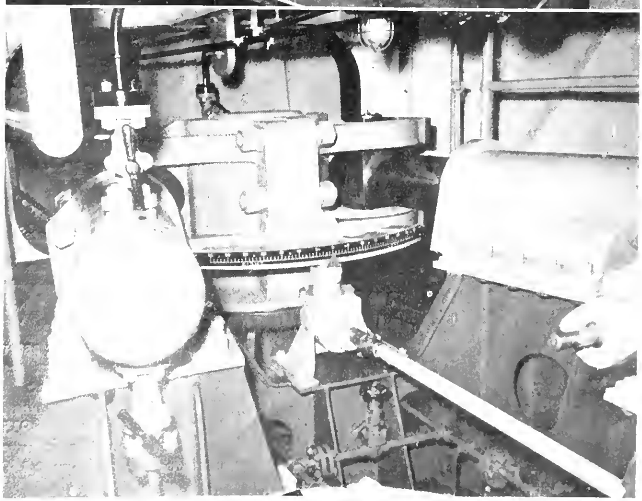
Center: Wheel house. Lieut.-Comdr. O. Breiland, U.S.C.G., is at the wheel.

Bottom: View of windlass taken during anchor test.



Profiles and Plans of the New Victory Ship





Above: A Weber life raft on board, fully equipped and ready for instant use.

Upper right: The big Majestic stove in the galley. Cooking on top of the stove are delicious filet mignons.

Center: The radio room.

Bottom: The steering engine is by Struthers-Wells.

feedwater heater and one bleed stage. The boilers are standardized units, sacrificing some efficiency but conserving in costs and materials. Fuel consumed per bhp hour is expected to be 0.59 pounds for the AP-3 and 0.66 pounds for the AP-2.

Electrical power on these ships is furnished by two 300-kw 120/240-volt direct current turbo-generating sets. One generator easily carries the normal seagoing load; two are required for working cargo in port. The emergency generator is a 15 kw, 120/240-volt direct current dynamo driven by a diesel engine.

No rubber is used for insulation on electrical conductors. On cables No. 10 A.W.G. and smaller synthetic resin insulation is used, and on No. 8 A.W.G. and larger varnished cambric. By an agreement with the regulatory bodies, U. S. Maritime Commission on this type of installation is allowed increased ratings and lower load factors, thereby saving approximately 20 per cent in weight of copper.

Special consideration has been given to speedy and efficient cargo handling. The five holds are served by fifteen 5-ton cargo booms and Holds No. 3 and No. 4 are serviced additionally and respectively by a 30

ton and a 50-ton boom. Fourteen cargo winches are installed, each driven by a 50-hp motor. Ten of these are single drum, single speed winches, each having a capacity of 7450 pounds at 220 feet per minute. The other four are single drum, two-speed winches arranged to serve at the slow speed the 30- and 50-ton booms, and having same high speed capacity as the ten with a low gear capacity of 19,000 pounds at 85 feet per minute. These winches are all of the new "Unit" type. All motor controls, resistors and electric brake are in one watertight steel cabinet attached to the side of the winch assembly, which is of welded steel construction, with everything except the drum and gypsey head completely enclosed.

The hull is to be all-welded, with this one very significant exception The stringer strake of the weather deck plating will be attached to the top of the shear strake of the side plating through a 6" x 7" angle to which the plates are fastened by double row riveting. Experience with cracks in plating indicates that they will stop at such a joint. Another innovation is that the bulwarks will be attached to the top of the shear strake by short welds with long spaces, the bulwark plating being cut back 6 inches through the length of the unwelded portions.

The first vessel of this type to be launched at Calship yard on Terminal Island, Los Angeles, California, was the China Victory. This vessel successfully passed her official sea trials on March 31, and was delivered on the following day to the U. S. Maritime Commission.

Victory Ship Characteristics

Length O. A.	455′ 3″
Length L. W. L.	444′
Length B. P.	436′ 6″
Beam molded	62′
Depth M. D. at S.	38′
Designed Load Draft	28′
Summer Load Draft	28′ 6″
Displacement S. L. D. tons	15,200
Total D. W. C. at S. L. D. tons	10,700
Block Coef. at S. L. D	0.674
Prismatic Coef.	0.682
Gross Tonnage	7612
Net Tonnage	4553

Normal SHP (AP-2)	6000
(AP-3)	8500
Sea Speed (AP-2) knots	15
(AP-3) knots	16.5
Capacities Bale Cargo—	
No. 1 Hold cu. ft.	70,425
No. 2 Hold cu. ft.	76,760
No. 3 Hold cu. ft.	136,190
No. 4 Hold cu. ft.	100,300
No. 5 Hold cu. ft.	69,535
Total cu. ft.	453,210

Performance data recorded on the trial run will be considered as standard for this type merchant ship, which is the Commission's fast new long-range cargo carrier. With a deadweight tonnage of 10,500, cargo tonnage of 9146, length of 455 feet, 62-foot beam, and 8500 hp, the China Victory performed beautifully on her trials and more than satisfied the expectations of the Maritime Commission.

Calship's chief engineer, W. C. (Pat) Ryan, and other veteran officials aboard, were impressed by the facts that the new ship achieved her high speed with a minimum of vibration, that her living and working spaces are comfortable and well equipped, that all auxiliary equipment is of the most modern type, and, in short, that the Victory is a measurable advance over the familiar Liberty ship, which has been doing such yeoman's service in the war effort of the United Nations.

Calship on November 28, 1943, laid the keel; and on January 26, 1944, just 59 days later, launched the hull of the first of 84 Victory-type ships for which this company holds contracts. Of the 84, 34 will be converted into transports; keel for the first transport was laid on March 28, 1944. The S. S. China Victoy will be operated by the Matson Navigation Company.

Maritime Commission's Tests

The sea trials included anchor windlass test; emergency steering test; 3-hour endurance and 1-hour overload run; turning circles; "Z" maneuver; ahead steering test; astern steering test; emergency astern test; and operation tests of equipment.

The 3-hour endurance run was at 8500 shp; overload (1 hour) at 9350 shp; ahead crash stop was followed by astern run for half an hour at 3500 shp.

Personnel aboard for the sea trials included: From the U. S. Maritime Commission: G. E. Nelson, D. P. Nilan, J. F. Gilbert, P. R. Fresia, W. Freeman, A. McCastland, James George, J. A. Volk, M. W. Jackson, J. T. Wishart, T. T. Overton, M. E. Lewis, J. Atkinson, J. E. Stewart, J. Hoogerwerf, A. G. McCarthy, J. A. Hull, J. R. Jago, C. J. Thompson, H. Stern, J. A. Nolan, L. C. Himes, C. R. Gardner, R. McLaughlin and E. L. Wells.

From the office of Marine Inspection: Lieut. Commanders J. A. Moody and O. Breiland, and Lieut. A. J. Stefan, all of the U. S. Coast Guard. American Bureau of Shipping: H. J. Summers, C. J. L. Schoeffer and P. Wright. From the U. S. Navy were: Lieutenants J. E. McRae, H. Hopkins and W. Wilson. From George G. Sharp Company: J. J. Buffone, R. E. Keyes, P. J. Carlaftes and S. Lewis.

The Matson Navigation Company's representative was Assistant Port Engineer Ray H. Sample. Representatives of the press present were: Charles Crawford of the Los Angeles Times, B. Reddick of the L. A. Examiner, C. Judson of the Daily News, E. Newton of the Press-Telegram, Eyre Powell of Powell Press Service, A. Rich of Shipyard Times, Paul Faulkner and Bob Clary of Pacific Marine Review, Ted Osborne of The Log, M. Harker of International News Service, B. Miller of United Press, and H. Keavy of the Associated Press.

Calship Officials Aboard

In addition to R. W. (Dick) Emery, News Bureau Manager; F. W Hayes, chief photographer; Ray Cha pin, news photographer; and ten other miscellaneous representatives, 22 trial observers, 14 from the deck department, 22 from the engine department, and 8 from the electrical department, other Calship officials included were: President J. A. McCone General Manager J. K. Doolan, Assistant General Manager A. O. Pegg Works Manager J. S. Sides, Chief Engineer W. C. Ryan, Assistant Plant Manager (Outfitting) R. W. Gerhart, D. S. Charles and C. J. Rettig Jr., chiefs of the Machinery and Hull Divisions, respectively, Engineering Department; J. Price, general superintendent of Hull Outfitting; H. E McEwing, general superintendent of Machinery; Joe H. Wadsworth, director of public relations; E. L. Grigs

Captain M. J. Gordenev, veteran skipper, Matson Navigation Co.

John A. McCone, president; Jerome K. Doolan, general manager; A. O. Pegg, assistant general manager; California Shipbuilding Corp.

Personalities on the Trial of China Victory

W. C. (Pat) Ryan, chief engineer, California Shipbuilding Corp.

Left to right: R. E. McLaughlin, electrical inspector; C. R. Gardner, senior electrical inspector; L. C. Himes, machinery inspector; E. J. McCarthy, hull inspector, Outfitting; H. Stern, acting principal machinery inspector; J. H. Nolan, acting first senior machinery inspector; James Stewart, principal hull inspector; J. Hoogerwerf, first senior hull inspector.

Left: Calship personnel cheering the clean-sweep trial run.

Below, left to right: Dick Emery, manager news bureau; and Joe Wadsworth, director of public relations.

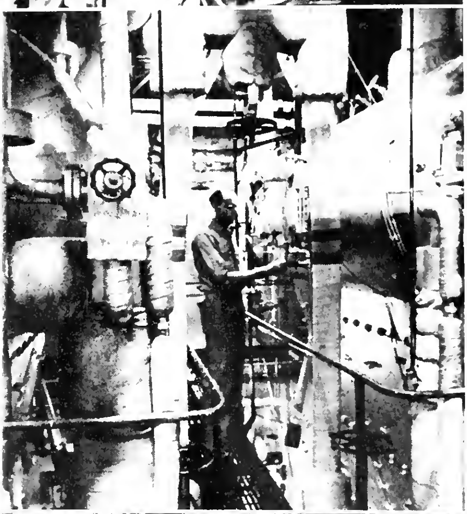
Left: Combustion control panel. Left center: Upper grating between boilers. Lower left: Battery of burner fronts.

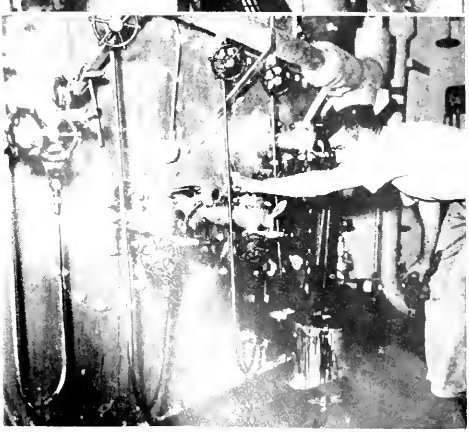
Upper right: A view of the refrigeration machinery. Lower right: Refrigeration box panel board, which tells the story of the temperature inside each of the four food boxes without going into them to find out. Temperatures in each box may be regulated from these panels.

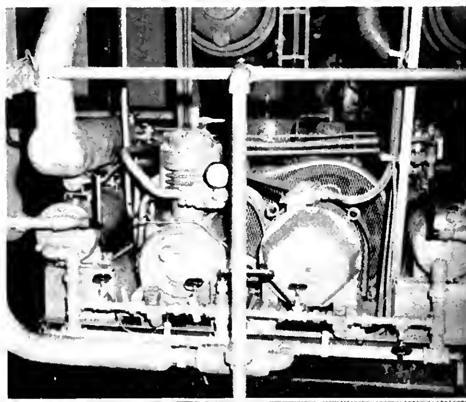
by, superintendent of Marine Electrical Department; J. F. Lee, chief draftsman, Machinery Engineering Department; W. R. Puglisi, material engineer; T. P. Loach, controller; C. E. Caldwell and H. S. Carrie, assistant superintendents of Machinery; L. B. Davis, assistant superintendent of Pipe Department; and G. A. Horton, traffic manager.

Among the Vendors

Interesting modern equipment noted on the China Victory included General Electric refrigeration, Westinghouse turbines and forced-draft blowers, Allis Chalmers condensers, Combustion Engineering Corporation boilers, Diamond Power Company

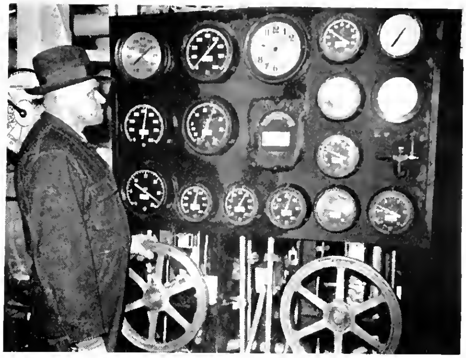




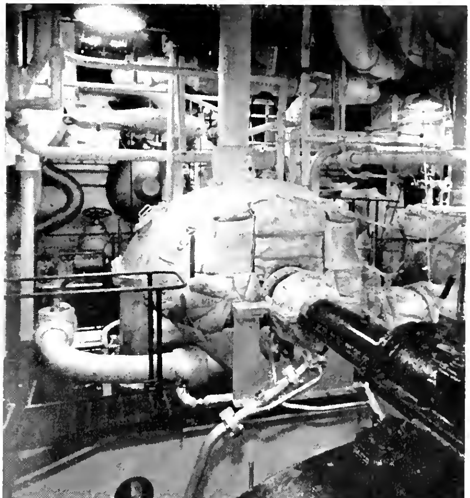


soot blowers, G. E. electric motors, Leslie reducing valves and whistle; American Hoist and Derrick winches with Westinghouse motors, Smith-Erickson Energy Meter trial run equipment, Worthington auxiliary reciprocating pumps, Ingersoll-Rand auxiliary centrifugal pumps, Hammel-Dahl automatic controls, DeLaval Steam Turbine Company stand-by feed pumps, Joshua Hendy auxiliary turbo-generators, Struthers-Wells complete steering system from wheel to rudder, Ralph E. Manns refrigeration, Northern Equipment Co. boiler feed control, Midwest Heat Service feed water heaters, Heat Transfer Products evaporators, Young Iron Works cargo gear, Weber life rafts, Welin lifeboats, Breidert ventilators, Walter Kidde fire detection system, Ilg fans, Ebco water coolers, McCord Detroit heating, Monitor automatic control, Submarine Signal Corporation fathometer.

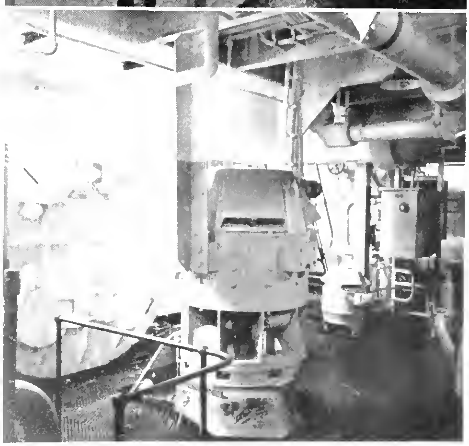
Vendors' representatives aboard included: D. Steward, J. C. Tiefel, F. Gray, C. D. Smith, D. R. Jenkins, R Cook and W. E. Lee of Westinghouse Electric & Mfg. Co.; J. Pestalozzi of Allis-Chalmers Mfg. Co.; C. P. Gruetzke, Jr., of Bludworth Marine Co.; G. Lloyd and W. H. Groundwater of Combustion Engineering Corp.; R. H. Tilghman and R. L. Dill of Diamond Power Specialty Co.; T H. Chamberlin and W. H. Smith of General Electric Co.; J. M. Costello and L. Serro of Leslie Valve Co.; T. M. Gardner and B. W. R. Hagen of Radiomarine Corp. of America; W. D. Johnson of Sperry Gyroscope; H. Farquhar and F. J. Swaney of Smith-Erickson; F. J. Povee of Worthington Pump & Machinery Co.; W. P. Ellery of Ingersoll-Rand; W. T. Mayer and C. Jolley of Hammel-Dahl; F. A. Hurlbut of DeLaval Steam Turbine Co.; W. F. McNeil, H. E. Morgan, E A. Kring and A. Hickey of Joshua Hendy; E. W. N. Bowes of Struthers Wells Corp.; R. E. Manns and O. L Benedict of Ralph E. Manns Co.; F W. Bunting of Northern Equipment. C. W. Mautner of Midwest Heat Service; and H. W. Parsons of Heat Transfer Products.



Engine control panel.



Low-pressure side of Westinghouse main propulsion turbine.

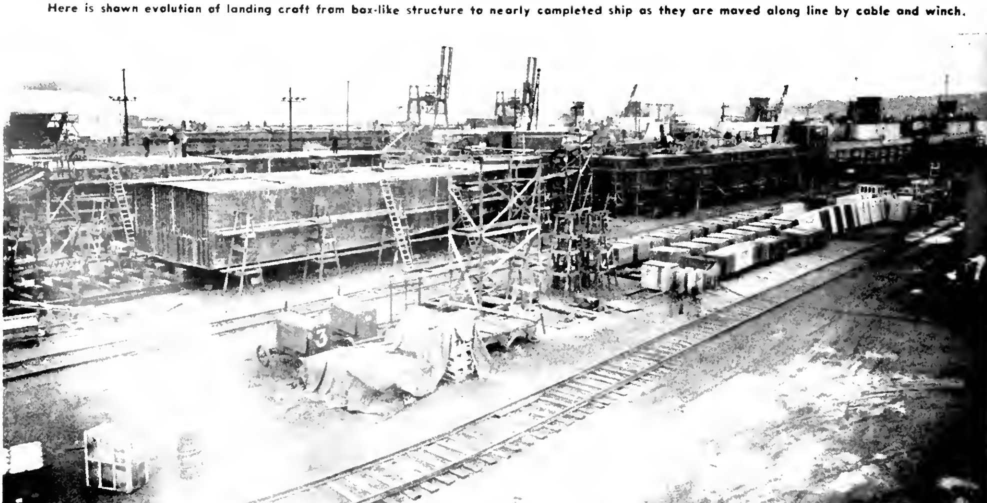


Lower grating of engine room, featuring Allis-Chalmers main condenser and Ingersoll-Rand pump.

A bluejacket salutes the flag as it is run up the halyard at commissioning of an LCI (L)—Landing Craft, Infantry (Large).

LARGE Landing Craft for INFANTRY

Here is shown evolution of landing craft from box-like structure to nearly completed ship as they are moved along line by cable and winch.



THE U. S. NAVY is just beginning to release information on much of its tremendous program of auxiliary fighting craft. When all the story is told we shall have a tale full of the dramatic energy of the established shipbuilding industry of America. We present here a brief account of the New Jersey Shipbuilding Corporation, which, under management of the Todd Shipyards Corporation, had produced 160 LCI (L) up to December 31, 1943, and since that date is continually accelerating its rate of delivery.

In the summer of 1942 the then new firm secured 34 acres fitted as an asphalt plant at Barber, New Jersey. Six months later, in November of that year, the first LCI (L) from this plant was in commission. The acreage had been transformed from an asphalt refinery to a streamlined modern ship erection and outfitting yard.

LCI (L) is a shallow draft motorship 157 feet long, equipped with everything necessary to take care of herself and her 27 naval officers and men on long voyages and to take care of 200 fully-equipped soldiers for several days. Her trim appearance and sleek lines are shown in the illustrations herewith.

These craft have already proved their tremendous value on the beaches at Sicily, at Kiska, at Tarawa, and at all of the shore points invaded by allied arms.

Hull sections of these ships are prefabricated and preassembled at a plant 14 miles away and hauled to the yard on huge trailers.

These hull sections, bearing carefully numbered designations of ship and position, are placed in cradles on the way. Then they are inched by railway crane into a perfect union, ready for welding.

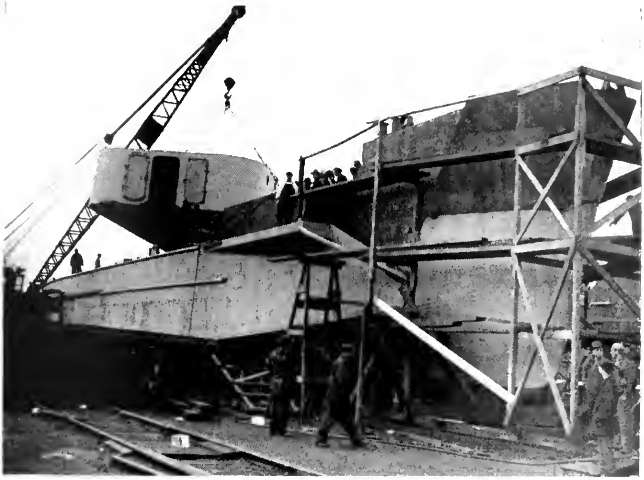
At Position Number 2, the deckhouse, fabricated in a shop within the yard, is hoisted by crane aboard the hull and welded in place. At Position Number 3, the combined pilot house and conning tower is swung up and gently lowered into place atop the deckhouse and welded there.

At Number 4, most of the installations are completed. At Position 5, the hull is ready for launching.

Launching at this yard is not in the conventional style. From the end of the way the LCI is pulled onto a launching dock, which in turn is towed into the stream. The launching dock's valves are opened, the dock sinks slowly into the water, and another vital landing craft is afloat.

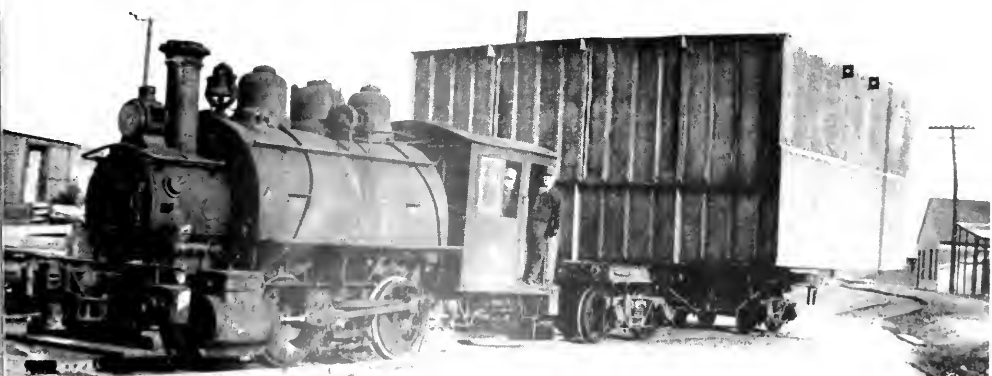
The LCI now goes to the outfitting basin, tying up at her dock. Here sealed freight cars, containing U. S. Navy equipment to be put aboard, are run alongside the finished ship. In from one week to ten days she is ready for commissioning.

Now the landing craft's naval officers and crew are aboard. There is a simple but impressive ceremony, and the ship is formally turned over to the Navy; the resident Navy supervisor reads the orders to the officers and men, the American flag is



The fabricated deck house is hoisted from a flatcar aboard a hull at Position No. 2 on the assembly way.

A prefabricated hull section is transported on an industrial railway flatcar from the fabricating plant to the shipway.



The picture above shows mass production by assembly line methods. Below, one of the craft is floated from the launching dock. She will be tied up for several days at the outfitting dock, where a sister ship is shown almost ready for commissioning.

run up on the signal mast, and she is off to war.

Into the new ship of war that has left her birthplace on a mission to be a well-kept secret until it is accomplished has been built the craftsmanship and fighting spirit of American workmen, the efficiency and experience of management. These are the qualities that make it possible to build a new ship in a new yard in record numbers.

When this yard went into production late in 1942 the man power situation was critical. War industries already had drained off most of the skilled labor in the steel and shipbuilding crafts. Thousands of willing unskilled men and women had to be trained for the job while they worked at it. Patriotic pride and eagerness to help quickly overcame inexperience, and they learned fast.

Behind the workers engaged in the actual construction of LCI's are the brains and skills and material resources of industrial America. No fewer than 23 subcontractors make finished parts and apparatus for LCI. Their factories are located in every section of the country, from the Atlantic to the Pacific. It is a tribute to their intensive production and to the transportation industry that supplies flow into the shipyard on time and in sufficient quantity.

Throughout all of this, in the early critical periods, with the growing-pains and the difficult but satisfying days of full-swing production, the United States Navy worked side by side with the management and the men in daily conferences on problems and requirements, and in expediting procurement of vital parts and materials through the Bureau of Ships.

Today on this former asphalt plant at Barber, New Jersey, as many as 20 of the new type large infantry landing craft move at one time from position to position along the "assembly ways."

LCI (L), like other weapons developed and mass-produced by America for the cause of the United Nations, is a combination of the skills and materials of American industry in widely-separated areas of the nation. Fifteen states, 32 cities and 63 manufacturers have a part in every LCI that takes to the water at the finishing basin of the New Jersey Shipbuilding Corporation.

ON THE FACING PAGE:

(1) Workmen completing a recently-launched ship.

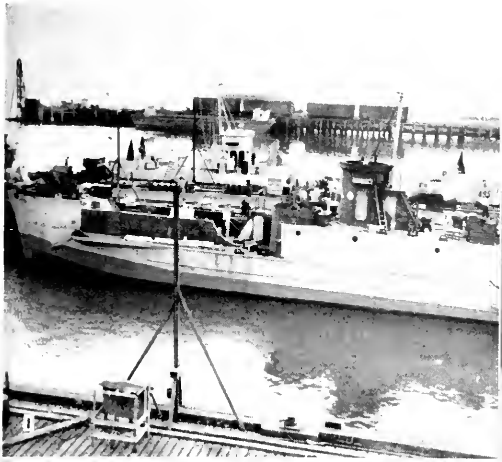
(2) One of the craft at the fitting-out basin.

(3) Finishing touches being given at the fitting-out basin. Sealed freight cars containing United States Navy equipment are run alongside the finished ships.

(4) Maneuvering in Arthur Kill after leaving the yard. The structure resembling a funnel is a combined pilot house and conning tower.

(5) Orders are read at commissioning ceremony, and added to America's fast - growing fleets of invasion craft is another LCI (L).

(6) One of the craft, having just been commissioned, is on her way.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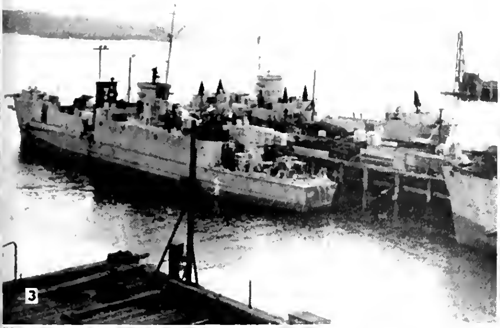
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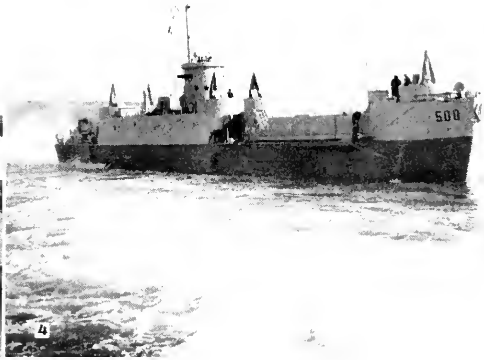
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Pacific WORLD TRADE

A Post-War Program Beginning Now

by T. Douglas MacMullen

Announcement

The future of shipping lies in its **use.** And the future of shipbuilding and ship repair and ship supply and ship fuel and ship paint and ship insurance lies in **world trade.** And ship carpenters, welders, machinists, electricians, and everyone concerned with the handling of ships, and their families and grocers and butchers, have a stake in **world trade.**

A "world trader" is not merely the export broker, or the steamship company. He is the manufacturer, the longshoreman, the sailor, and from ten to thirty per cent of the American people.

To help make the Pacific area future-conscious, we are establishing this WORLD TRADE SECTION in Pacific Marine Review. It will deal with Shipping and Shipbuilding, Imports and Exports, Marine Insurance, Finance, Aviation, and the Ports of the Pacific.

Your suggestions and criticisms are invited, as are your requests for treatment of particular subject matter.

J. S. HINES, Publisher.

Foreign Trade Means Ships

Every firm and person with even a remote interest in ships or shipping should constantly be promoting the foreign trade idea. They can do this by urging surveys of foreign markets for particular commodities—and one local export firm is even now shipping thousands of different items to forty countries. The foreign trade idea can be incorporated in every advertisement in trade or other papers and in every speech and business letter. The reiteration that foreign trade means ships and ships mean construction, conversion, repair, service and supply will directly benefit every port in the country. Ships mean crews and longshoremen, architects and brokers, mechanics and investors, manufacturers and traffic men, bankers and insurers.

Let us never forget that foreign trade means ships.

Are Pacific Coast Shipbuilders Interested in Foreign Trade?

You will say, "Yes, of course we are." But we get answers that run all the way up and down from that. One prominent builder said, "What the hell do we care about foreign trade? That's the steamship companies' worry."

"Few of the shipyards," says Admiral Vickery, "which once astonished the world with their tremendous volume of construction during the first world war's program survived the years of peace which followed."

Charles L. Wheeler, executive vice president McCormick S. S. Co. and Pope & Talbot; vice chairman National Federation of American Shipping.
(Photo by Warner James)

Now if you were an average manufacturer with a well-balanced peacetime sales program, you would be getting 16 per cent of your sales volume from foreign trade—in a very great many instances the difference between red and black ink on your year-end statement. One-sixth of your factory force, one-sixth of your salary, or one day a week in each pay envelope.

But as a shipbuilder your post-war interest is close to 100 per cent.

What will your ships be used for? Every shipbuilder should be thinking in terms of world trade—freight and passenger—of the future, and he should be thinking of it **now.** Like the bricklayer who said he was "building a cathedral," every engineer, clerk, crane operator, welder and subcontractor should feel that he "is in world trade."

Come war's end, and the short period of conversion, if he isn't in world trade, **he isn't in shipbuilding either,** for therein lies shipbuilding's future.

Pacific WORLD TRADE

THE FOREIGN TRADE OUTLOOK

Prepared Especially for "PACIFIC MARINE REVIEW"

by

William L. Montgomery
Manager
World Trade Department
San Francisco Chamber of Commerce

Forecasts are generally erected on the basis of known facts of what has occurred, and as extensions of current and past trends.

To forecast now the outlook for foreign trade one must assume certain conditions. One set of conditions would lead to one forecast. A different set of conditions would lead to an entirely different, perhaps entirely opposite, forecast. With the war's end no one today can state with definiteness what will be the conditions for foreign trade. Will foreign trade be freed of wartime controls of space, price, import and export license? Or will the controls be continued indefinitely into the post-war period? Will foreign trade be characterized by government-to-government barter? It should be clear that until post-war procedure for foreign trade is definitely established the outlook for foreign trade is clouded.

In public addresses by Washington officials it is remarked that Governmental operation as well as control of foreign trade must be in the post-war period. Plausible reasons are advanced to justify these Governmental plans.

As long as materials may be in scarce supply and to discourage skyrocketing of prices as a consequence of competitive bidding by buyers, price control in the post-war world would be acceptable to many foreign traders. But of other wartime controls the temper of importers and exporters is quite definitely in favor of relaxation as soon as possible after the war.

Government is not just talking about Government operation of foreign trade. Government in wartime is now experimenting with a view to conducting foreign trade in the post-war world. Foreign traders who feel they should continue within a system of free enterprise should not delay in making their views known to Washington. They should not now tolerate establishment of precedents in Governmental foreign trading which may be compared with the camel getting his nose under the tent. One suggestion is that the Government would act in partnership with foreign traders. Does this mean that the foreign trader in the post-war world would operate on a fee-basis, by governmental sufferance? Foreign traders would do well to be alert to current trends and move now to protect their interests within the range of what may be best for the country as a whole.

WILLIAM L. MONTGOMERY
Manager, World Trade Department
San Francisco Chamber of Commerce

Consensus of foreign traders is that there is a tremendous backlog of business with all foreign areas. Estimates of cash available for immediate post-war purchases by Latin America range between $2\frac{1}{2}$ and 5 billions of dollars. These cash credits represent excess of United States purchases over exports during wartime. China is known to have amazing recuperative powers. She was making long strides towards industrialization when war intervened. China has already prepared 5-year and 10-year plans for developing railway transportation systems on a vast scale. These examples are only indicative of post-war potentialities.

Our industries will require vast stores of raw materials for peace-time manufacture of goods become obsolete or worn-out during the war period, or which have disappeared altogether from distributors' floors and shelves. Certainly there is no question about an effective post-war demand to sustain a revived foreign trade. The big question is: Will the Government get and do the business or will the private foreign trader resume his accustomed role of principal and factor?

It is up to the foreign trader to make his views prevail.

Setting Up for Export

To detail the entire procedure for developing an export volume would make it seem difficult when it is not. There is a lot to learn, and plenty of room for the exercise of business judgment, but if each step is taken after due preparation, and the obtaining of professional services on such matters as require them, it is possible to develop a line of foreign trade right alongside of your domestic sales. Many firms have dreamed of a place in the world trade picture but have never gone ahead because of lack of the initial know-how. The know-how can be readily obtained.

Assuming that you have an exportable product or line of products, make a survey of one or more world markets where your product might be used. Inquire of the Bureau of Foreign Commerce, the Chamber of Commerce, the foreign department of your bank, the American Express Company, the trade promotion departments of the major steamship companies. They will often put you in touch with acceptable foreign connections, and will guide you in your dealings and future progress.

Assign some important person in your office, employing one, if necessary, to be responsible for the success of the new activity, and see that he has, or gets, the necessary training and tools to do the job.

The main thing is to put your heart into it, and the program will unfold itself. You will be planning for the future, and, at the same time, be taking a step in preparing post-war employment opportunities. If 8000 Western firms do this, the benefit to the entire West will be very real indeed.

Pacific World Trade

The Import-Export Partnership

It is one of the basic tenets of world trade that there must be imports in order that there may be exports. For how else can export debits be liquidated?

In the past there have been various compensating elements in international finance, which will continue to do their part in balancing trade between countries. Passenger travel, for instance, has always played an important part in circulating American money abroad. So have dividends on foreigners' investments in the United States. So have ship service and freight charges. So have American capital investments in other lands. So has the multilateral traffic wherein A country ships to B country who ships to C country who ships to A country. And there was finally the transfer of gold to make up the balance. It goes without saying that all of these processes will be continued, but there will be a trend in the post-war era that will be carefully guided and nurtured to the end that the tremendous volume of exports now in prospect will in large measure be used for industrial development; at least so in those industrially-minded nations that are blessed with a wealth of raw materials. Such a nation creates its own wealth and can pay for its purchases in other forms than in goods.

Outstanding among such nations is China. During the first three decades of this century trade between the United States and China increased just about 100 per cent every ten years, in spite of the floods and famines (one or more every year) and wars with which that good land has been blighted. Chang Kia-ngau, until recently China's Minister of Communications, and now advisor to the Executive Yuan, links this increase in trade directly to the expansion in China's railroads, highways and hydro-electric power, and the growth in domestic production and standard of living which these improvements have brought about. Mr. Chang predicts that the first post war year will show China buying 150 per cent over her last normal year, and with the retrocession of extraterritoriality, exorbitant interest rates, and other things that in the past confined too much of China's commercial development to the treaty ports, investments will flow into the interior and railroads will be extended into the rich and vast farm areas. Employment will rise, labor will be better paid, production from farms and mines will increase, and wealth will be created that will pay for multiplying imports.

This program is without contemplation of the released wealth of Manchuria, and China's inheritance of much of the foreign trade of Japan to such Far Eastern countries as Thailand, French Indo-China, Malay States, Netherlands East Indies, Korea and even India. From this trade alone China can develop and export credit large enough to pay for all her imports from America.

China is a prime example of a potentially great industrial country with the ability to create its own wealth.

Another example, and of an entirely different type, is to be found on the American continent. In January of this year, A. A. Pollan, executive vice president of the United Fruit Company, called attention to our practical dependence on Mexico, Central and South America, for coffee, natural rubber, bananas, cacao (cocoa), abaca and other rope fibers, and much of our quinine, palm oil, castor oil, teakwood, mahogany, dye woods, balsa and other vital and strategic timbers, and many important tropical drugs and essential oils. Many of these crops were formerly drawn almost entirely from the Far East and Middle East, but Mr. Pollan believes that the interdependence of the Americas will continue after the war, and his company is going to help it to do so.

Here's how. Through the centuries, much of the fertile lands of the American tropics have remained in swampy, disease-infested jungles. The United Fruit Company's enterprise is one of developing farm sites from the unproductive wilderness. They begin with elaborate surveys of topography, soils, drainage and railroad sites. Then river ports, airfields, hospitals, workmen's quarters, field clinics and supply depots are built. Supplies of drinking water are developed, farms laid out, bridges and roads built, churches, schools and other public buildings are erected. Good workers are employed at good wages. The banana industry, for instance, requires the services of more than 200 skilled trades and professions, and the company operates schools for teaching these activities to the natives. Wages compare favorably with those paid in the United States to trained personnel. Similar programs are under way with many another product which 40,000 experimental acres have proved susceptible of profitable cultivation. The citizen farmers are shown the developments and may, if they wish, establish the crops in their own fields.

Here is a case in which American capital is put to work in a foreign country and made to aid that country in creating the wealth with which to eventually pay for its own growth and at the same time create a demand for the products of American manufacturers of agricultural implements, building materials and thousands of other items.

The examples of China and of Middle America are no doubt well known, but they are mentioned here at some length to point up a trend in world thinking that should go a long way toward putting foreign trade on a permanently sound and constructive basis and to get away completely from the methods of earlier years whereby trade was balanced by loans or securities issues which proved to be but the soil in which international distrusts and hatreds grew.

In the past we have seen a sort of see-saw condition in the trade balances of various countries. From 1930 to 1940 practically all of South America was chronically short of dollars for the purchase of American goods. Now, because of our huge purchases of her products for our war needs, notably tin, copper, manganese, rock crystal, rubber and hides, as well as coffee, cacao, petroleum and casein, coupled with our inability to make return shipments, the shoe is on the other foot. The merchants all have money and the countries all have dollar exchange.

By the end of this year we shall owe Latin America nearly two billion dollars in exchange, available for the purchase of American goods. We shall also owe balances to India, South Africa, Australia, and possibly New Zealand. And all those countries are starved for American merchandise. Thus the pendulum swings back, and we shall eventually be where we were before the war. We can avoid the see-saw of trade balances by helping other countries to create their own wealth.

Pacific WORLD TRADE

Banker Looks Ahead

By Elliott McAllister

To those of us seeing the war through at our accustomed place of business, the future holds a challenge. Today we represent the home front, but when the shooting stops we move right into the front line. It will be our particular job in our own particular sphere of influence to help re-establish the trade of the world, and that will be a big job. Today we can trade with only a small percentage of our former connections and we must renew relationships with firms all over the world from whom we have had no word for years.

When the shooting stops, American industry will be hard at work reconverting itself to a peace-time basis. And the success of this effort is essential to the maintenance of employment and the absorption of the men released by the armed forces. In this program our export and import business will play an important role in the distribution of all types of goods. Additionally, we must assist a stricken world in reviving its economic life.

So first of all our exporters and importers will have to busy themselves and get those orders moving. The banks with experienced foreign department personnel stand ready to finance this movement of goods and to clear the proceeds. Furthermore, the banks are at all times anxious to assist their clients in establishing new connections, to obtain credit information, and generally make themselves as useful as possible. If you need an outlet or supplier in India, or Urugay, or Timbuktu, tell your bank about it, and, by cable or airmail, your inquiry will be serviced. Don't forget that your bank has a world-wide network of correspondents on whom to call.

And now a word directed to those companies which would like some foreign distribution, or which require imported merchandise, yet who are not justified in maintaining their own export or important departments. Get hold of a reliable and

ELLIOTT McALLISTER
Vice President Bank of California

responsible exporter or importer and let him do the job for you. This business requires the experience of a professional and it should not be engaged in haphazardly or as a marginal operation. The job includes the sending of key personnel abroad on periodic trips. It should never be regarded merely as a "sideline."

And so we should begin to look forward to the time when the trade lanes are reopened. Our Government has promised that restrictions and regulations will be withdrawn at the first practical moment. We hope and expect that this promise will be kept. The goods and markets will be there, and all of us vitally interested in foreign trade look forward to doing our share towards winning the peace.

Our World-Wide Sales Force

In a recent address Joseph C. Rovensky, vice president of New York's Chase National Bank, described a far-reaching aspect of this world-wide war which is of unusual importance from the standpoint of post-war foreign trade. (Any post-war foreign trade program has as a primary objective, the welfare and prosperity of returning soldiers.) In addition to fighting the war, Americans in uniform now scattered over the entire world have with them certain American products which they are demonstrating in one way or another to other peoples. Whether they be bazookas or bicycles, bulldozers or tractors, planes or plastics, they are in effect "selling" American products to prospective post-war customers. Each American base is a working model of the American way of life in which the local populations have become participants as well as spectators. They are observing American appliances in action and are being trained in the use of our tools and products. New desires are being created which may well have a tremendous effect on world trade in later years. "This wholesale foreign distribution of American products and technicians and by the lend-lease process constitutes," goes on Mr. Rovensky, "perhaps the greatest advertising campaign that the world has ever known. An incidental and accidental part of the war effort, it is the sales manager's dream come true, and we should be prepared to follow it up later on."

The foreign branches of American banks are keeping an eye on the development of demand for all sorts of American products, and your home banker has access to many of their reports. He can also advise regarding credit risks and financing routine.

However, at this time and well into the future there will be but little thought of credit, for there will be plenty of foreign buyers who can pay cash.

The important thing is begin your planning **now.**

Gold

Scorn it if you will, but gold is still all-important to most of the world. If the program for stabilization of world currencies that was partially worked out during the April conference in Washington by treasury officials of 34 allied and other countries is ever animated, the actual transfer of gold balances will again be a regular proceeding.

Even post-war isolationists now agree that some plan of stabilizing post-war exchange and promoting post-war world trade is a key to prosperity and continued peace. A fundamental condition is a sound and reliable monetary system, operating all over the earth. The nations of the world must be able to buy things with money, without much change in its value from day to day and month to month—whether purchases are made at home or abroad. For nearly 30 years, assured monetary stability of this kind has been lacking, and the world has suffered economic and social turmoil.

Gold is the only answer, unless mere paper credits will suffice. And 34 nations seem to feel that in times of stress mere paper is just "scraps."

Pacific World Trade

China—A Ready-Made Market

By Julean Arnold

China had embarked upon the road to modernization before the Japanese marched into her country. In fact, it was bacause China was making such astounding strides in industrialization that the Japanese launched their invasion. They were determined, before China got too far along, to wrest control of the economic resources and man power of the country and divert these into a contribution to Japan's military domination.

China must have tens of thousands of miles of railways and hundreds of thousands of miles of modern highways. She must have hundreds of ships, scores of flying fields. She must electrify and equip hundreds of thousands of diversified industries set up over vast areas of heavily populated country. And above all, she must modernize her agriculture.

The individual Chinese, armed with the implements of a modern industrial society, will become manyfold more productive. His earning power will go up and up and up, and this means ever-increasing purchasing power and rising living standards. Her imports will skyocket to heights never before imagined, and she will buy billions of dollars worth of capital goods of various kinds to keep pace with the accelerating momentum of its modernization.

Specifically, then, the industrialization program will include:

Tens of thousands of miles of railways. Equipment for same.

Hundreds of thousands of miles of highways. Many bridges.

Scores of flying fields.

A vast mercantile marine. Harbors. Docks. War houses.

Nation-wide telephone systems. Radio broadcasting stations.

Hundreds of thousands of factories on a decentralized plan.

Development of mineral resources.

Hydro-electric plants. Distribution systems. Irrigation works.

JULEAN ARNOLD
Pacific Coast Representative, China-American Council for Trade and Industry; former Commercial Attache, Shanghai.

Modernization of agriculture.

Thousands of educational institutions. Hospitals. Health centers.

If our laborers, miners, farmers, merchants and capitalists are wise, they will cooperate in speeding up China's industrialization. By so doing they will go a long way toward insuring peace and prosperity on the Pacific and toward eradicating unemployment at home.

In New York, U. S. businessmen have formed the China-America council of commerce and industry under the chairmanship of Thomas J. Watson. The council is opening an office in Chungking to facilitate two-way trade. An office has already been opened in San Francisco under the management of Mr. Arnold, who was for many years our commercial attache in Shanghai.

Mr. Arnold's experience with Japanese mishandling of American freight to China dates back to abandonment of the old Pacific Mail service to China, which left the Japs in control of shipping. Much of our goods for China was dumped off at Kobe, where the Japs operated on it in one way or another.

The Belknap Glass Company of Seattle had been accustomed to an average breakage of 2 per cent in plate glass. The Japs made this figure 20 per cent. On other shipments they removed names of consignees to avoid delivery. Bookcases for schools and colleges were delivered without hardware for the shelving and doors. Gravel was found in phonograph mechanisms — hardly standard practice in American factories. The idea of course was to discredit American products and to point out the advantages of Japanese production and delivery.

We will not have to contend with such "incidents" in the future.

China—A Post-War Shipbuilder

That China's post-war industrial plans include development of shipbuilding as well as shipping was disclosed recently by Wei Wen Hang, Chinese shipping leader, who recently visited Pacific Coast shipbuilding plants to observe the methods used in quantity production of ships. As deputy general manager of the China Merchants Steam Navigation Co., which formerly handled the greater part of Chinese shipping, Wei says that the primary aim in the post-war period is to make China strong, and that an important element in this program is to build up the shipping on her rivers, along the coast, and in foreign trade. He was sent to the United States to make contacts for post-war development, but especially to see how hordes of men and women unskilled in shipbuilding have been adapted to the task of mass-producing ships.

Great numbers of smaller type ships will no doubt be bought outright in the United States. But for China's own shipbuilding industry, every modern technical device will be studied and imported for use in Chinese yards. China has its own steel and hardwood supply, but will need plenty of mechanical parts as well as engineering skills.

That China in the post-war picture will be a very important factor in exporting to all of the Orient is generally agreed. And, as such, she will be paid in terms of the Orient's wealth. In her forthcoming industrial era, China would seem to have the prospect of becoming a reservoir of wealth and money exchange that the rest of the world will do well to recognize in its full potentials. That the United States is already doing so is a credit to our forward-looking foreign traders. Our technical and engineering fraternity should not overlook so potent a good neighbor.

Pacific WORLD TRADE

Inland Free Ports?

That air cargo planes inbound from foreign countries will open up many industrial areas of the interior to direct world trade is the prediction of Thomas E. Lyons, executive secretary of the Foreign Trade Zones Board. He points out that there are 49 airports designated by the Treasury Department as ports of entry. Some of these airports of entry, while in border states, are a considerable distance inland from the sea and frontier. Cities and towns such as Chicago, Cincinnati, Detroit, Wichita, St. Louis, and Fairbanks, Alaska, can become **foreign trade centers** as vital as seaports are today. It is neither visionary nor impracticable to foresee the day when ice-free harbors will no longer be the exclusive lifeline of a nation's overseas commerce. Bad weather, as the only present obstacle, is rapidly being overcome.

Foreign trade zones, as free ports are coming to be known, are merely enclosed places where imported products may be stored or processed pending re-export, and avoid import duties unless released for domestic use. Heretofore only seaports have been thought of as potential free ports, but for such products as will use the air carriers in the future, free ports can be anywhere.

But foreign trade zones on the seaboard need not fear such competition; they should rather welcome it. For the bulk shipments will still come by steamer, and air cargo will open new markets and sources of supply which surface carriers will serve. Every increase in world trade volume will trickle down through every branch of the industry. The steamship lines operating air routes, or with air feeders, will benefit in three ways —the direct air haul, the inland free port sampling of bulk seaboard deliveries, and the overall benefit mentioned above.

There will be more on this subject in a later article.

Army Reconsignment Depots

Where Railroad Freight Arrivals Are Coordinated with Ship Sailings

Fading from the memory now is the complicated mess that railroad freight was in during the last war. Official count showed as many as 200,000 freight cars backed up from Eastern ports, the railroad yards and sidings were clogged with vitally needed freight clear back into Middle Western cities. The nation's traffic men seemed to have but one giant and interminable task—locating freight cars. And when a car was located it would, more often than not, be parked beyond hundreds of other cars and it might take days or weeks to clear the way. No engines, no men, no time.

This time the story is very different. Warehouses may be jammed, but not the railroad yards. And the cars are kept moving.

Addressing the Pacific Traffic Association's annual railroad night banquet in San Francisco recently, Col. W. A. Williamson, Chief, Traffic Control Division, Transportation Corps, U. S. Army, explained the present system:

"Obviously," said Col. Williamson, "with millions of tons of war freight destined for every United Nations port in the world, it is not possible to link up a particular car or a particular package with a particular ship." The plan devised for the present war is simple, but the operations in total are stupendous.

There have been ten "holding and reconsignment depots" established a hundred miles or so inland from the ports of embarkation, and back of these there are "regulating stations." The department interested in a particular shipment traces it across the county, and if the vessel that is to take it is not in port, or has to await repairs, the car is diverted to the holding depot and unloaded, thus releasing it for other use, and keeping the tracks and freight yards at the ports clear. A clue to the volume handled and the enormity of the task will be noted in the fact that the depot serving the San Francisco port has from 30,000 to 50,000 cars unloaded most of the time.

With a 48-hour notice that the ship is ready, the freight is reloaded into cars and will be on the pier at the proper time.

Sounds simple, and it is. It works beautifully. Transportation is one of the ways in which this war is being managed better than the last one.

Will Air Cargo Replace Ship Cargo?

"Many recent post-war prophesies concerning the future of air cargo transportation would seem to have emanated from uninformed theorists rather than from practical, far-visioned men of varied transportation experiences." Thus L. O. Head, president of the Railway Express Agency, deflates certain post-war planners.

That the airplane will replace the freight and passenger trains, the surface express service, and the trans-ocean steamer lines is the expressed opinion of bug-eyed air enthusiasts.

But regardless of the trend of legislation now being considered in Washington and other world capitals, it is extremely doubtful that the cargo or passenger plane will ever reduce water-borne tonnage, nor, for that matter, rail or highway tonnage. It seems far more likely that with greater air development other types of service will benefit.

A recent study by the Standard Oil Company discloses that for operation of the types of cargo planes now in use it is necessary to send more than a ton of fuel over the ocean in tankers for every ton of cargo carried through the air, and as we get into super-planes of the Mars type, the tanker fleet to serve them with fuel alone will number nearly twice the cargo ships the planes will replace. While it is true that in peace-time a wider distribution of cracking plants for hundred-octane gasoline may reduce the tanker loads, the very construction and maintenance of such plants will be a very real freight item in themselves. The traveling public establishes the need for supplies of all kinds, and freight business follows. Both steamship and airline officials are pretty generally agreed that ocean cargo will be greatly increased due to air operations, and the only likely effect will be on the first class passenger traffic.

We will have an up-to-date survey of opinion and actual data on joint air and water operation in the next issue.

Pacific WORLD TRADE

San Francisco World Trade Center

The San Francisco World Trade Center project has progressed to the point of incorporation, and has won the formal approval of every civic organization to whom it has been submitted. Incorporating trustees include prominent foreign trade, marketing, insurance and other leaders, as follows

Leland W. Cutler, A. M. Donnan, Howard Hancock, O. C. Hansen, Ernest Ingold, A. H. Jacobs, Leland Kaiser, Ira S. Lillick, M. J. McCarthy, Wm. G. Merchant, B. Frank Modglin, Frank K. Runyan, Harry S. Scott, Hon. Edw. H. Tickle, Ray B. Wiser.

It is proposed that a conveniently located World Trade Center be established in San Francisco with all modern facilities for handling world trade, attracting foreign countries and their traders as well as American exporters and importers, manufacturers, bankers, transportation companies, custom house brokers, freight forwarders and every line of industry having to do with world commerce.

To this end, under the sponsorship of the San Francisco Foreign Trade Association and its parent organization, the San Francisco Chamber of Commerce, there was incorporated at Sacramento, California, on March 17, 1944, a non-profit corporation with fifteen trustees selected by the Chamber. The pricipal purpose of the corporation is the development of the project to a point where it can be financed principally by private funds, although municipal, state and Federal funds will doubtless be sought for certain buildings for governmental needs and for improvements within and adjacent to the Center.

The site which the trustees have in mind for the Center is an ideal one and would be located on the site of the present wholesale produce district, at least all that area bounded by Battery, Clay and Pacific Streets and the Embarcadero, if [illegible]

O. C. HANSEN
Managing Partner, Frazar & Hansen; Originator of World Trade Center

moval of the present produce district to a more suitable location is already supported by the San Francisco Chamber of Commerce, the California Farm Bureau Federation and other farm groups, in line with a survey made by the United States Department of Agriculture and the University of California. Any plans of the World Trade Center trustees in this regard would be integrated with plans for the same area by the City Planning Commission, the State Highway Department and the Board of State Harbor Commissioners.

The proposed Center is a section of the city with buildings especially designed to provide every facility for transacting foreign trade (both exports and imports).

(1) The Center buildings will be adjacent to the Custom House, the Appraiser's Building, and the Federal Reserve Bank, which house Federal offices important to world trade.

(2) Buildings in the Center will provide for the following requirements, with space allotted in accordance with the needs of each:

(a) A permanent exhibit by foreign governments or concerns of products of other countries.

(b) A permanent exhibit of products of our own factories, particularly the technical lines such as machinery, automotive, agricultural and construction equipment, and commodities not otherwise exhibited at the Merchandise Mart, the Ferry Building or the Fashion Center.

(c) All modern foreign trade facilities for world traders and for exporting and importing manufacturers and for consular officials, for the World Trade Department of the Chamber of Commerce and offices for banks, insurance companies, custom house brokers, freight forwarders, transportation companies—air, ship, rail, truck and bus.

(d) Buildings for service organizations, such as the headquarters for unions concerned with world trade, sailors, longshoremen, warehousemen and the like.

(e) For housing organizations interested in international good will and understanding, such as the Institute of Pacific Relations, Pacific House, International House. Halls, meeting rooms and headquarters offices are required.

Since the Federal buildings previously mentioned, and representing an expenditure of approximately $15,000,000, house many offices important to world trade, the Center should, in our opinion, be adjacent thereto.

By providing all facilities for international trading in one compact area, world traders will be induced to come to our State, thereby restoring California's place in world commerce and greatly augmenting our volume of trade by the resulting attraction of new factories to this area.

The construction of the buildings of the Center will provide a considerable work pile for workers now engaged in shipbuilding and other war production, as well as for returning service men for whom the employment problem is already becoming critical. This, however, is not a "make work" project but one which will result in bringing to the State of California an annual turnover of many millions of dollars and, what is even more important, one which will require a great increase in manufacturing facilities within the State and thereby materially help dissipate the coming labor problem.

This is a project worthy of the best efforts of all Californians. The trustees have been working on this matter for some time, and will continue until the project emerges. We ask for your wholehearted cooperation, and with it we are confident of success.

Pacific WORLD TRADE

U. S. Army Has Largest Merchant Fleet

That the world's largest merchant fleet is operated by the U. S. Army will surprise many. But it is the reason, rather than the fact itself, that should interest steamship men and all who live by ships, including labor.

The reason is, of course, that Army installations—or fighting fronts—are scattered over most of the world's surface, and these must be supplied. As island after island is retaken, additional names are added to the Army's customer list to be serviced.

It is expected that these operations will pass to private hands at war's end, but there is heard some expression of unwillingness to have American responsibility for remote peoples subject to any of the uncertainties of private operation.

The Army's present merchant fleet includes ships owned by the Army, ships under charter or assigned to the Army by the War Shipping Administration and operated by commercial shipping companies, and more than 150 different types of boats, large and small, from hospital ships to tugs and launches.

Matson to Test Naval Aircraft

A contract has been consummated between the Bureau of Aeronautics of the Navy Department and the Matson Navigation Company providing for the test flying, ferrying, and servicing of naval aircraft, according to an announcement by William P. Roth, president of the company.

"This undertaking," said Mr. Roth, "has made it possible to effectively employ a substantial group of men experienced in air transport, maintenance and operation. We are continuing on an increased scale our preparation for participation in air transport over Matson's steamship routes and have recruited supervisory personnel for our Air Transport Division from the air transport field."

THEY SAY—

Every steamship company solicitor should be trained to sell the foreign trade idea in his district.

Phil Hoyt.

Steamship companies should publicize the amount of local business they create in the ports and trade areas they serve.

—A. J. Dickie.

There are 1500 more potential foreign traders in San Francisco.

—Chamber of Commerce.

Foreign trade is a basis for good neighbor relations.

—Secretary Hull.

Russia's Export Volume Small

That government monopoly in exporting does not serve to build a large, wholesome volume of world trade is suggested by a reference to Russia's export figures, recently quoted by Publisher Franklin Johnston at the San Francisco Foreign Trade Association.

Russia, with a population of 167,000,000, averaged, over a twenty-year period, about one-third of the average under the Czar. The export total for the period was in fact less than that of Switzerland.

Freight Damage Claims Reach Studendous Figures

In announcing a "safe packing" month for shippers, Walter H. Rohde, manager, transportation department, San Francisco Chamber of Commerce, quoted some startling figures on damage claims due to improper packing. He stated that the railroads of the country paid claims in excess of $40,000,000 during 1943. This figure does not include highway traffic, express, nor insured ocean traffic.

Most of the increase in damage claims over 1942 was due to heavier loading, use of second hand containers, scarcity of dunnage, and to inexperienced help. Mr. Rohde makes the point that damage in transit results in loss to everyone concerned, and more often than not in the loss of war production. At the very least, it means delayed deliveries.

S. F. Chamber Broadcasts

In a series of radio broadcasts that began on April 9, the San Francisco Chamber of Commerce is featuring "the road map to San Francisco of tomorrow," an overall program for post-war city improvement, the first unit of which deals with the entire shoreline of the peninsula, the problems of tideland reclaiming, wharves and piers, pleasure facilities, and many others. The removal of the city's produce terminal and its replacement with a foreign trade center is a part of the plan.

General title of the broadcast is "Open up those Golden Gates," and the speakers have been Adrian Falk, president of the Chamber; Ernest Ingold, past president; and Leland Cutler, vice president of Fidelity and Deposit Co.

Programs scheduled for the future include San Francisco's proposed World Trade Center, Transportation, World Commerce on the Airways, and many others.

Shipping and world trade will be major topics.

The program is the outgrowth of the Chamber's former Saturday program, "Business Views and News."

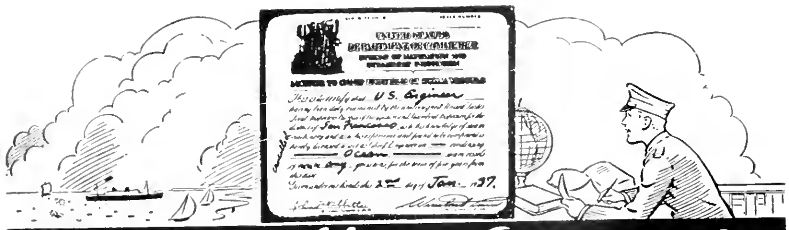
Ship Shuffle

President William P. Roth of the Matson Navigation Company reported having lost 11 steamers in 1943 due to enemy action. He also reported the sale of 8 freighters to the Government. This makes a total reduction of 19 cargo vessels, and leaves the active Matson fleet at 17 cargo and 4 passenger steamers, all of which are under charter to the War Shipping Administration. Matson is acting as general agent for the W.S.A. for most of these, as well as for more than 50 steamers of the Liberty and long-range types owned by the Maritime Commission.

These ships are being used in the Australian-New Zealand and South Seas service, in which Matson Oceanic was the pre war dominant operator, and in which area Matson's agency and husbanding facilities equip them to best handle the war time traffic in this vital territory.

This is not a new story, of course. Our merchant marine is being reshuffled like a game of blocks. And we will be missing many units.

Almon Roth will be the speaker on San Francisco's Maritime Day celebration on May 22. The Chamber of Commerce is the host, and Mayor Lapham will introduce the speaker.



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California

AUXILIARY GENERATING SETS

MAINTENANCE OF TURBINE

Successful operation depends largely upon the care and attention given the turbine. Make systematic inspections and tests periodically, carefully following the instruction given below.

Inspection

Once a week inspect the exterior of the machine, giving special attention to the following points.

Clean and oil the spindle of the throttle valve and the connections between the levers of the governing mechanism, using a light, heat-resisting oil to prevent gumming.

Watch for and repair promptly all oil leaks and seepages.

See that the oil strainers are clean.

Keep the operating valves free from dirt at the lift rods to allow the valves to seat properly.

Once a year completely dismantle the turbine and examine the interior for dirt, rust, or corrosive accumulations. Inspect the steam strainer, the seats of all valves, all valves, the emergency governor, and the parts of the emergency tripping device.

Inspect parts of the main governor and the pilot valve.

Test the operating valves twice a year to see that they close tightly and shut off the steam: if they do not, they should be resurfaced to restore the proper fit.

Make a compl[illegible] the log sheet each time th[illegible] are inspected, tested, [illegible] paired.

Carefully clean all [illegible] assembling.

Corrosion

Corrosion and rusting impair the reliability and the economy of operation of the turbine, but may be almost entirely prevented by continuing the operation of the air pump to dry the machine after it has been shut down and while it is still hot.

Vacuum

Economy of operation is largely influenced by the vacuum maintained; therefore keep the packing and joints in condition to prevent air leaks. The vacuum joints can generally be kept tight by application of asphaltum paint, red lead, or some similar substance along the joints and around the bolt fits.

If a high standard of vacuum is once attained, it should be maintained easily and permanently by a proper investigation for air leakage, and by proper maintenance of the condenser.

Rotor Balance

Freedom from vibration is essential to the successful operation of a steam turbine. The turbine rotor is, therefore, carefully balanced both statically and dynamically before assembly. If, during operation, the rotor becomes out of balance, it is most important that balance be re-established.

In most cases vibration may be traced to faulty alignment, improper setting, or defective foundation. These features should be carefully inspected before making any adjustment to the rotor itself.

If the rotor appears at fault, and upon inspection shows wear of parts or non-uniform incrustation, it should be thoroughly cleaned.

If balancing is found necessary, it is well to proceed systematically, keeping a chart record of each trial.

Lubrication

Success in the use of oil is attained only by continual care, observation and treatment. As the oil passes repeatedly through the bearings, it gradually loses its lubricating qualities, and new oil must be added as occasion demands. If properly filtered and cared for, oil may be used over and over again for many months, depending on the initial quality of the oil, the effectiveness of the strainers, treating devices and filters, and the number of hours per day the unit is in operation.

Since the life of the bearings depends on the proper functioning of the lubricating system, every effort has been made in the design to reduce to an absolute minimum the possibility of the bearings' suffering from an inadequate oil supply. However, it is necessary to watch the temperature of the bearings and see that an adequate supply of clean oil is kept in the system.

Oil Specifications

Oil, to give successful results, should meet the following specifications.

It must be a mineral oil free from:

(1) Tarry, slimy or saponifiable matter.

(2) Acids, soaps, or thickeners.

(3) Water, dirt, grit, or other suspended matter.

(4) A tendency to rapid breakdown by carbonization or sludging.

(5) Any tendency to permanent emulsification.

A reasonably high flash point is desirable, 330 F., or higher in an open cup tester.

The viscosity should be between 185 and 205 seconds at 130 F. as measured by the Saybolt Universal Viscosimeter.

The viscosity, while important, is not the only value that should govern the selection of an oil, for it has been found that satisfactory results have been obtained with oils varying greatly in viscosity. What is essential is that the viscosity be such that a proper film of oil will be maintained between the rubbing surfaces.

Suggestions

The following suggestions in connection with the subject of lubrication are presented for guidance:

(1) See that the oil in the tank is clean. Pay careful attention to maintain the oil level uniformly within the range specified by the oil gage.

(2) A steady increase in the oil temperature with normal operation of the unit indicates oil fatigue, as a result of which the lubricant becomes thick and stringy. Under these conditions, use new oil.

(3) Test the oil cooler periodically for water leaks.

(4) To avoid possibilities of explosions keep flaming lights away from the oil-tank openings when the oil is hot and vaporous.

(5) Do not use gasoline as a cleaning liquid; use kerosene oil.

(6) Do not use waste or other linty substances on oil-covered interior surfaces. Wiping cloths are better, but do not use these cloths around moving machinery, as accidents are liable to happen.

Shut-Down Period

If the turbine is to be out of service for a considerable length of time it may be advisable, depending on local conditions, to take precautions to protect it from deterioration due to corrosion. This applies especially to the shaft journals and to the shaft in the vicinity of and directly under the shaft end packings. Slushing may be advisable, or it may be wise to remove the packings entirely.

Take necessary precautions that there is no leakage of steam past the throttle valve to the turbine rotor. Drain the water from the oil cooler.

At this time it may be advisable to clean the oil system, including tanks, piping, oil passages and oil cooler, and to make a thorough inspection of all the wearing parts of the unit.

Assembling and Starting

Before reassembling the parts that have been slushed with oil, they should be thoroughly cleaned with kerosene and dried with cheesecloth. The interior of the turbine should be thoroughly cleaned and any dust or grit carefully removed.

Clean the interior of the bearing brackets and the oil tank.

It is advisable to blow out all piping and oil passages or oil hose with a steam jet to remove any accumulation of rust which may have occurred on the interior, and then blow out the pipes and passages with air to dry them.

Examine all bearing or rubbing surfaces for rust spots. If any are found, endeavor to remove them with cheesecloth saturated with kerosene. If this is not successful, use a smooth oil stone and kerosene, rubbing the spot lightly.

The bearing surfaces of all pots should be clear and free from rust spots or injury, and coated with the kind of oil used in service before they are assembled. When reassembled, they should have the proper working clearances.

A Certificate of Merit

One of the most helpful activities extant for the U. S. Merchant Marine is the certificate for fine marine books which the Cornell Maritime Press presents to the top man in each graduating class at the United States Merchant Marine Academy.

The Cornell certificate of merit gives the man to whom it is presented his choice of $10 worth of Cornell textbooks. The text of the certificate is as follows:

BOOKS ARE WEAPONS

This certificate will be honored upon presentation personally, or by mail, at the offices of Cornell Maritime Press, 241 West 23rd Street, New York 11, N. Y., or at Cornell Book Shop, 350 West 23rd Street, New York 11, N. Y.

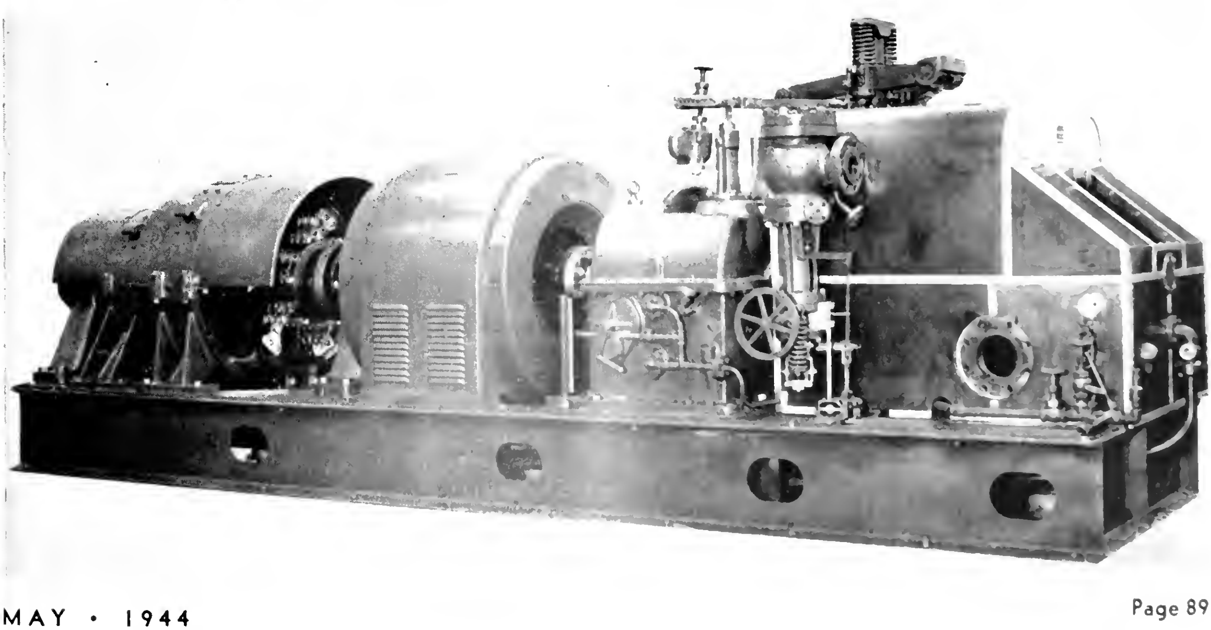
The United States Merchant Marine Academy has set standards to match the great tradition of the Merchant Marine serving the United Nations at war. Every Cadet-Midshipman shares the responsibility for the strengthening of these standards and prepares for the greater responsibility to come, by supporting that tradition in his scholastic efforts, discipline and conduct.

It is in recognition, therefore, of your outstanding work during your period at the United States Merchant Marine Academy that the Cornell Maritime Press, publishers of marine books, is proud to present you with this certificate of merit entitling you to ten dollars worth of Cornell Maritime Press textbooks.

This is the tribute of the Cornell Maritime Press, and of me personally, to you as the top man in your class. A good job well done!

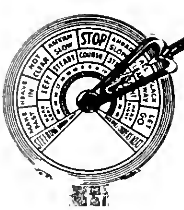
(signed) *Felix M. Cornell.*

Geared a-c and d-c steam turbine-generator set, 525 kw, for light and auxiliary power on turbo-electric tankers.



Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

SAFETY AT SEA—A JOINT RESPONSIBILITY

by Capt. H. C. Shepheard

Sound insurance of safety is sound economics. It is sound strategy. And it is sound psychology. Moreover, since nothing moves the public more than a major disaster and loss of life at sea, it is also sound public relations. In no other one direction can time and effort and money be spent for greater dividends than in preventive measures to insure, as adequately as is humanly possible, the safety of our merchant ships and our merchant seamen. It is necessary both to the survival of our country and to the efficiency of our Merchant Marine. It is not an emergency program in concept at all. It is a continuous process, a constant struggle for improvement and for bettering the record. It has, in fact, become recognized by the far-sighted shipowner and operator as an integral part of his business.

Safety for our merchant ships and merchant seamen is not a thing that has been, or should be, a set of restrictions and regulations and requirements imposed from without. It is not something which we in Washington are determined to inflict upon you ship operators for its own sake or merely to vindicate our own existence. We are merely your allies in this job. If we strip down the superstructure and get back to first principles (which is a good thing to do now and then), the Coast Guard's Merchant Marine Inspection Division can be rightfully understood as nothing but an agency at your service. In the interests of uniformity and efficiency, its basic functions are to advise, to recommend, to test and to regulate, and, finally, to administer those measures which by common consent and by common experience, are known to be necessary to the safe operation of our shipping.

I want to emphasize this point because it seems to me that, in the web of regulations and inspections, we are apt to confuse the means with the end. The only implements that any administrative agency has at its disposal to carry out its functions are, first, to regulate, and second, to see that those regulations are effectively put in operation. But neither of these things amounts to much in itself if its purpose is lost sight of. And our purpose, again like that of preventive medicine, is health—the health of the Merchant Marine. That is our common ground and our common interest. It is your vital concern, and it is our very reason for being.

Any campaign for safety must be a cooperative venture. You cannot legislate safety into existence. You cannot administrate it into existence. And you cannot inspect it into existence. Safey proceeds from the common will of all people concerned, and in the maritime field it involves not alone the governmental agency charged with its regulation and administration, but also the owners and operators of ships, the officers who run them individually and the men who man them. Consequently, it has been our purpose to act with the industry to insure safety, rather than to exercise authority over the industry. We have always been eager for the industry to understand our aims and our methods, to work with us in realizing the former and carrying out the latter and to be our partners in this joint task of bringing about a maximum of safety with a minimum of regulation. Such a degree of cooperation is an absolute, and not a variable, necessity to the success of the program for safety at sea.

The main means of securing such cooperation from the merchant seamen themselves has been a constant process of education in the principles of safety by such measures as drills, talks and instruction by publications. We have taught them what to do and what to avoid doing, but they have also taught us, for there is no education that is the equivalent of experience. And we have seriously considered and charted and studied every suggestion that any survivor has ever made to us. Many such suggestions have resulted directly in the adoption of some new equipment or some rewritten regulation. In my office in Washington I keep for constant reference a master chart of these suggestions, none of which, however lacking in feasibility it may seem, is ever dismissed as of no consequence. For such suggestions, whether they be recommendations for new measures or criticism of the existing equipment, have represented as high a degree of cooperation from survivors as we could ask.

Primarily, I think, any intensifying steps which we can take to further our campaign for safety at sea must be the product not exclusively of the Merchant Marine Inspection Division but also of those who own and operate merchant ships and of those who man them. Since the beginning of the war, I have been greatly impressed by one thing that stands out again and again in the statements of those who are in the best position to know: the merchant seamen who have gone through a sinking, who have had to abandon ship and who have had to combat every kind of adverse condition im-

The author is Chief, Me[illegible] Division, U. S. Coast Guard [illegible] an address before the Great[illegible] Council, delivered on March 2[illegible]

aginable. Their suggestions are many, ranging from comments on the kind of supplies lifeboats should have to the type of signals that should be used. And in all this great and varied range of testimony, the one point most often repeated and most vigorously expressed is the necessity for continual drills in abandoning ship.

On one ship that went down there were no less than nine survivors who emphasized above everything else incidental to the sinking the necessity for more lifeboat drills.

The officers' statements at inquiries into sinkings bear these men out in their recommendations. One of them summed it up very wisely when he said, "I find if you have a set plan and have done things several times, regardless of the fact that you are excited, you do that automatically." This seems to me a very clear summary of the entire philosophy of drilling. You do it often enough according to plan, and then you do it automatically in the event of an emergency.

This is the kind of preventive safety measure that cannot be made effective simply by regulation and inspection. Its success depends entirely on cooperation. We can require by regulation that crews be drilled, and it is possible for us to supervise a drill in port and to talk to the men on proper safety measures. But it is impossible for us to go out with every ship and see that drills are held periodically. Only by the cooperation of the operators and the officers and men can such insurance be guaranteed. It is, therefore, not only in theory but in actual fact, necessary that this whole fight for maritime safety be the common fight of all of us. None of us can do it alone. None of us can do it independently of the others. It is a cooperative venture in purpose, and it must also be a cooperative venture in performance.

This war has required us to make vessels safe without slowing them up. This has been a challenge calling for quick decisions and swift action. I believe the record of performance of our merchant ships to have far surpassed the best that any of us dared hoped for during the darkest days of the Battle of the Atlantic.

Ours is a permanent battle, a continuous strife for safety. If we work together, it will succeed. If any one of us becomes indifferent, then the work of all of us will fail. The choice is ours.

BOOK REVIEWS

Primer of Navigation, Second Edition, by George W. Mixer; 514 pages with a tan buckram cover, illustrated with numerous diagrams and tables; published by D. Van Nostrand Company, Inc., New York City; price $4.50.

Compiled to teach surface navigation to the student, this primer is a ready reference on modern navigation, both coastwise and at sea. It also includes material of value to experienced skippers, to aviators working in celestial navigation, and to Merchant Marine officers.

New subjects treated in this edition include compass adjustment, gyro systems, maneuvering board methods and an important chapter on the use and meaning of Sumner lines.

The treatment of celestial navigation has been simplified, and includes the use of Air Almanac for marine work. The elements of a day's work are outlined in detail. Problems begin with the simplest plotting exercises and take the student through all of the computations required in this study. Finally a series of cruise problems completes the practical work.

Lifeboat Manual, by A. E. Redifer, Lt. Comdr., USMS; 165 pages; published by Cornell Maritime Press, New York City; price $2.00.

Written by the Lifeboat Training Officer at the Avalon, California, Training Station, this is a book for the thousands who go to sea, and especially for those who are preparing for the lifeboat examination.

It contains information needed about lifeboats, drills, launching, survival rules, seamanship, rafts, floats, first aid, and sailing terms.

The rules are written in an understanding manner, and methods of handing boats are clear and concise in the presentation.

Audel's Marine Engineers Handy Book, by Edwin P. Anderson; 1258 pages, profusely illustrated; price $4.00; published by Theo. Audel & Co., New York City.

This book covers modern marine engineering with latest information in a handy size, including all branches, with step-by-step solutions on hundreds of problems, such as Marine Engineering Physics, Combustion and Fuel, Steam and Its Properties, Marine Boilers, Steam Turbines, Diesel Engines, Lubrication, Pipefitting, Ship Propellers, etc.

Coast Guard inspectors seize every opportunity to board merchant vessels for the purpose of drilling and instructing crews in the use of life-saving, firefighting and safety equipment. Here an inspector instructs the crew of a tanker in the proper method of quickly launching lifeboats, adjusting life preservers and lowering life-saving nets for abandoning ship purposes. Note the interest of the men in what he is telling them.

Pacific Coast Marine Activities

by Special Correspondents

Tuna Boat Trends

A tour of inspection of the San Diego shipyards now reverting to construction of the long-range tuna clippers reveals the trend to be toward larger, faster and more efficient vessels. On a number of these vessels, the engines will be fitted with superchargers to boost horsepower as much as 50 per cent, and this constitutes the principal innovation in the power plants.

Considerable effort has been expended toward smoothing up the characteristically stubby lines, particularly in the after body, where most of the propelling power has been lost in the past. The generally longer hulls will permit of much improvement in the buttock lines and result in better power-speed curves.

Practically all of the big new boats will be all brine refrigeration with steel tanks, and welded steel bait tanks are contemplated for some. The all-welded steel tuna clipper has not appeared among recent contracts, but it is evident that such a vessel is being given very serious consideration and at least two are on the drawing boards.

The National Iron Works of San Diego have established their new steel yard near the foot of 28th Street and are rushing the construction of a large number of U. S. Army welded steel cargo barges, some of which will be refrigerated. When this program is completed it is apparent that a fine large plant will be available to turn out welded steel tuna boats.

The past winter lay-up period has seen many of the old timers receive extensive face liftings. American Clipper will go to sea with $100,000 rebuild, including a new raised deck forward and new deck house, which will completely alter her previous appearance as a single deck boat. She will return to service as a part brine boat with new steel brine tanks.

Columbus, Morning Star, Benita and other boats are now having steel brine tanks fitted, and Glory of the Seas has had a new bow fitted and nine feet added to her length, which greatly improves her appearance. All these boats are at the Campbell Machine Company.

At the Lynch Shipbuilding Company a new Lusitania is emerging from the cast-off chrysalis of the old and is taking shape as a raised deck boat about ten feet longer and almost two feet wider than in her former existence. This was accomplished by cutting the hull down to the bilges full length and reframing to a new set of lines above the turn of the bilge.

M. Martinez Passes

The entire San Diego waterfront was saddened by the sudden passing of Marcos Martinez, dean of Southern California Custom House brokers and for many years the Honduran Consul, on April 2 at the age of 75. Few had known that Mr. Martinez was ailing, as he had attended to his business at 772 State Street, and across the street from the Custom House, although he had been troubled with a heart condition for several months. He transacted business in his office on Friday, March 31, and died on the following Sunday in his home.

Mr. Martinez was born in Guadalajara, Mexico; at the age of 11 came to the United States and at 26 established himself in San Diego, where he had resided for the past 49 years. He was the oldest established custom house broker in San Diego, and was prominent in civic affairs and Masonic activities. Surviving are his widow, a daughter and two grandchildren.

Coronado Roads Proposed

Information has come to hand that the Government plans, as a post-war measure, to provide increased anchorage facilities for the fast-growing Pacific Fleet by development of the Coronado Roads. While reported to be in development stages, the proposal contemplates the construction of the two-mile-long, 300-yard wide, reclaimed area shown on the Harbor Plan chart as extending westward from near the lower end of the Silver Strand. This would reclaim some 578 acres for shore facilities. The plans include a long stone jetty to extend from the outer end of the reclaimed area in a northwesterly direction to the edge of the present channel into San Diego Bay. The enclosed area of the Coronado Roads would consist of almost eight square miles, half of which would have a depth of 40 feet, and less than one-fifth of the area would have a depth of 19 feet or less at mean lower low water.

Northwest Fishing Industry

All of Seattle's 180 halibut fishing vessels were idle as of April 18, and 1400 fishermen were "on the beach" in a protest against the OPA reductions in the ceiling price of this fish. In the ports of British Columbia and Alaska, 350 more halibut boats were idle. These fishermen take 50,000,000 pounds of halibut annually. They claim the reductions imposed by OPA will reduce their earnings by more than $1,000,000. Meetings are being held to iron out the differences; it is hoped that adjustments will be made so that the business may continue with profit to all concerned.

Delay of the OPA to act on salmon price adjustments is worrying the Seattle Fishermen's Cooperative Association. An OPA ruling forces this

Association to pay its members for their catch the identical price that it receives for the fish in the Seattle market. Since the average cost of handling the fish is 2 cents a pound, the Association loses 2 cents for every pound of fish it handles. It, therefore, asks that it be allowed a selling differential of 2½ cents. If this reasonable request is denied, the Co-operative will have to go out of business. It represents approximately 800 independent boat owners and handles over 85 per cent of the troll-caught salmon brought into Seattle.

Alaska Salmon Industry Inc., representing 53 Alaska canneries, question the jurisdiction of the War Labor Board to force the signing of a contract with Fishermen's Unions, claiming that decisions of the board were secondary to legal contract rights. Issues of this controversy are: machinists' room and board; Bristol Bay tenders' pay; and a 7 per cent basic wage increase. The industry refuses to pay the latter, except as a bonus.

The Puget Sound salmon canning industry has been "concentrated" by an order from the Federal Coordinator of Fisheries, effective on July 15, which limits all canning operations to one cannery at Anacortes, owned by the Fishermen's Packing Corporation. This merger: closes eight canneries; effects a man power saving of 547 workers; and releases 27 cannery tenders for other operations.

Shipyard Activity

At the **Todd Shipyards,** Seattle Division, in addition to a large volume of repair work, there was completed recently a big conversion job. A troop transport, of 10,700 deadweight tons, was virtually reconstructed to become a floating general hospital equipped with all the apparatus required by modern therapy and surgery.

Quarters were arranged for ship's officers, ship's crew; medical officers, nurses, and several hundred patients. Each hospital ward has its diet kitchen, and the holds are divided into compartments for storage of medical supplies and food, many of these compartments being refrigerated.

There are two operating rooms equipped with all the latest surgical gadgets, including: complete X-ray examination chambers; complete sets of eye, ear, nose and throat instruments; surgical lighting fixtures; and the most modern sterilization apparatus and operating tables. In short, this ship is now a complete and up-to-date floating general hospital.

Seattle division of the **Seattle-Tacoma Shipbuilding Corporation** has been awarded a fifth Army-Navy "E" for the "splendid production record that has been established and maintained" at this plant.

The Bellingham Iron Works is at work on a recently awarded U. S. Army contract for 8 all-steel Navy yard tugs to be known as YT's. The craft are of 65 feet length and 16 feet beam, and are diesel driven. They will cost approximately $120,000.

The Northwestern Shipbuilding Company of Bellingham, and the **Pacific Shipways** of Anacortes, have each recently delivered a wooden cargo and passenger vessel to the Army Transportation Corps, Seattle Port of Embarkation. This makes the 19th such delivery from Northwestern and the 4th from Pacific Shipways. This type of craft is 148 feet long, 33 feet beam and 17 feet depth, powered with a diesel engine. It is the largest wooden power-driven vessel being built for the U. S. Army in the Pacific Northwest. The design is by H. C. Hansen, Seattle naval architect.

On April 17 the Vancouver, Washington, yard of Kaiser Company Inc. launched its 41st flat-top. This escort aircraft carrier was christened Alikula Bay by the wife of Senator Wallgren.

New Packers of Emergency Rations

The California Ration & Equipment Company completed installation of equipment and began operations early in May in its new plant at 1960 Carroll Avenue, San Francisco, California.

The company, packers of the Multiple Pack Food and Water Breaker, presents to the trade the new California Breaker Ration-unit consisting of: lifeboat or raft food and water requirements for one man, containing ten quarts of water packed in six rectangular cans, each holding one and two-thirds quarts of water; fourteen ounces each of chocolate, Ration C, malted milk tablets and pemmican equally divided between two rectangular cans. The eight cans are packed in corrugated cardboard shipping containers, making one ration unit.

The ration-unit is hermetically sealed, eliminating danger of outside contamination of water and protecting the food from moisture and humidity.

The water is not distilled, but is treated and sterilized by electronic apparatus, and all cans are dated when packed. The cans are specially coated to resist salt water and weather.

Gerald J. Howard is partner and general manager of the company. The equipment was installed by Joseph R. MacDonald, engineer and designer, who is connected with the Multiple Breaker Company of Garwood, New Jersey.

BOOK REVIEWS

Meteorology Workbook — With Problems, by Peter E. Kraght; 148 pages; published by Cornell Maritime Press, New York City; price $2.25.

Here is a book planned as the first step for the beginner who must approach the subject of meteorolgy without aid of physics or mathematics and gain for himself a working knowledge. Illustrations and graphs with brief, concise explanations constitute most of the first fourteen chapters. The last chapter deals with weather observations and symbols, containing sample weather maps and photographic reproductions of cloud forms.

Primer of Navigation Key, by George W. Mixer and Ramon O Williams; 200 pages; published by the above company; price $3.00.

This is a key to the above primer, containing the solution, with full detail, of more than two hundred problems in modern navigation, preceded by statements of the problems. Solutions used for working the sights are those of H. O. 211, H. O. 214 and Ageton (1942). Every sight for line of position is solved by each one of these three methods with the Nautical Almanac excerpts for reference. Plotting of all problems, when required, is shown in complete detail. Excerpts from both Almanacs are a separate section at the back of the book.

Ship Construction Booms Sailmaking

A round dozen of the usual cabaret dance floors could be lost in this one corner of the busy sailmakers' loft. All finishing work is done near the walls, with the huge floor reserved for laying out.

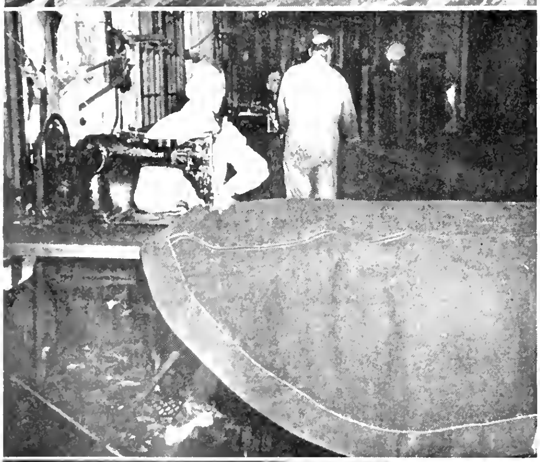
The progress of ships from sail to diesel and steam caused a slump in one of the most colorful crafts of seaport towns. Sailmakers found their skills no longer in demand, as they were when every ship on the seven seas carried hundreds of yards of canvas made up into sails on the floors of the pavilion-like lofts of the sailmakers.

However, with the coming of the war's stepped-up shipbuilding program the men of the awl, needle and twine have come back into their own with a vengeance. The nation's fleet of tankers, transports, Libertys and Victorys needs ventilating cowl covers, lifeboat covers, winch covers, windlass covers, canvas deck runners, weather cloth and hatch cover tarpaulins, which the sailmakers are turning out at full speed.

A recent tour through the Louis Ottesen Company loft on Pier 5 on San Francisco's Embarcadero with W. H. Hoskier, managing partner of the busy firm, revealed a full crew working at capacity speed turning out the aforementioned items, plus cargo slings and hundreds upon hundreds of snowy white laundry bags and duffle bags for seagoing men.

The largest pieces of canvas going out nowadays are not so big as the huge mainsails of sailing ship days, but sailmakers still find that a hatch cover tarp 40 feet long and 25½ feet wide, containing 472 yards of 42-inch canvas, is quite a job.

When mothers make shirts and skirts for their children they usually do their "layout" work on a table top, but laying out a hatch cover tarp for a ship needs enough floor space for a good-sized dance hall.



A newcomer to the business would find it difficult, but stitching up a ventilating cowl cover is taken right in stride by the experienced sailmaker pictured here.

Left: The last step in finishing a huge hatch cover tarp, soon to see service on the deck of one of our fleet of Liberty ships, is punching holes for grommets along the rope-bound edges of the heavy waterproof canvas.

Right: W. H. Hoskier, managing partner, is on the job and works right along with his crew getting out hundreds of yards of canvas goods every day.

Ship Ventilation

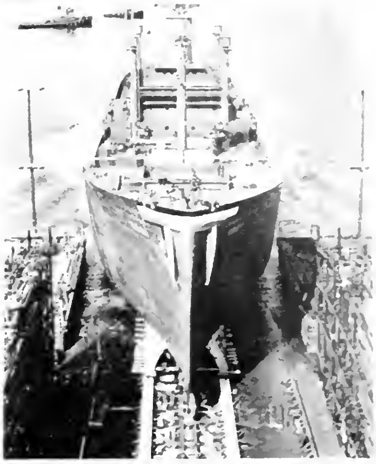
by C. D. Lutton

One of the first vessels to reach the United States from Germany after the first world war was a sailing ship which docked at Marcus Hook, Pa. The writer had occasion to visit this boat at that time, and found that the descent to the quarters below was like rolling hisory back a hundred years. All the stories and pictures of the old-time sailing ship came to life in an instant!

Here was a combination sleeping quarters, mess and galley, all rolled into one. The atmosphere was more foul than it is possible to imagine . . . the air was laden with stale tobacco smoke, sweat, cooking odors and other smells not distinguishable. This, coupled with the vermin and the general untidyness of the place, caused but one desire, and that was to leave immediately. Evidently, ventilation had never been in the minds of either the builders or operators of this boat, for the only way any fresh air could get into the room was through some small transom sash or through the open companionway. If the boat were running into a heavy sea it would have been impossible to have any of these open.

This example was not an isolated one. Ships of more recent vintage are less congested and cleaner, but aside from providing for the engine room, little had been accomplished in the way of ventilation.

One of the most radical changes in the history of natural draft ventilation was the introduction of the "Breidert Air-X-Hauster" by George C. Breidert. While this ventilator was primaily designed and sold for land use, naval architects and shipbuilders quickly realized its distinct advantage as compared to the cowl (the most common type ventilator used on ships), the mushroom head, the Liverpool Head (used on galley range flues), and other types of ventilators common in all industry. Here, for the first time, was a design that was different, and its performance was unbelievable. Here, too, was offered something new — a ventilator that gave positive ventilation at all times with no back or down drafts — a ventilator that functioned without having to be turned, regardless of the wind direction; had no moving parts to corrode; was light and spray proof, and would function in either a vertical or horizontal position. This made it possible to maintain a blackout, yet ventilate, even if the Air-X-Hauster was placed in a porthole. It could be placed on the deck or high up on top of a kingpost or deck house where the air would be turbulent or downward. This would make no difference, because the Breidert Air-X-Hauster would function as long as



Air-X-Hausters on kingposts of S. S. China Victory, being launched at the California Shipbuilding Corp.

moving air would hit it. Last but not least, its manufacturer had tested it for directional winds, something unknown in this field before.

Recent investigations have shown that this equipment has certain advantages over other types of exhaust heads used on mechanical systems. This ventilator, being a standard item, can be purchased noticeably cheaper than a special made-up head.

Air-X-Hauster mounted on hatch leading to forward crew's quarters, in foreground, on the well deck of the Chilean Navy ship Lautaro.

Air-X-Hausters installed on the super deck of a concrete oil barge.

Training Shipbuilders Faster

A photographer, an army veteran, a merchant mariner, a farmer and a city employee line up as trainees at the welding school in the Federal yard. They'll graduate as tack welders within a 48-hour-week training period.

Fitting man power and woman power into shipbuilding faster is a Navy-size job spurred on recently at U. S. Steel's Federal shipyards at Kearny, N. J., and at Port Newark.

Federal has expedited the breaking-in period through a get-acquainted system. This helps the "new hand" take his allotted place quickly in the shipbuilding team. On the first day, the new badge enters a "class" in the shipyard's training school. He is welcomed to the yard, and learns about Federal-built ships in action. The ABC's of safety are taught. He is shown by diagrams and maps where he is to work, where to get tools and lunches, and how, when and where he will be paid.

In small groups, shipbuilding men and, at Port Newark, shipbuilding women, are introduced by sponsors in the departments where they are to work. They show these newcomers their jobs, and have them shake hands with their bosses, the supervisors and other shop employees. The sponsors contact their proteges frequently, and as a result the newcomer adjusts himself more quickly. Square-peg-and-round-hole situations are recognized immediately by the "foster poppa." Men are assigned jobs where they are happiest and can work at their best production speed.

Master shipbuilders, tradition says, are the product of years of experience. But peace-time pace is out in a win-the-war year. Today waiters, barbers, photographers, farmers, clerks and wounded veterans of World War No. 2 are taught to perform single jobs or even parts of a regular shipbuilding trade in order to speed ships for invasion.

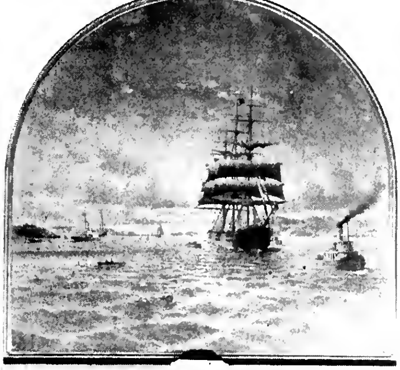
First on the list of needed man power for shipbuilding are welders. Those who sign up for welding are sent immediately to the shipyard's welding school, where, within a 48-hour week, they pass welding tests and become "tackers."

All shipyard fledglings are given an examination and an efficiency rating at the end of 30 days. If they pass, their probation is ended. Then they are on their own to increase their skill as shipbuilders. They build destroyers, destroyer escorts, combat cargo carriers and other naval auxiliary ships, which slide down the ways toward war from the shipyards at Kearny and Port Newark.

Employees in both shipyards number more than 40,000. Hundreds of these shipbuilders are being called to the armed forces. With output schedules 20 per cent higher this year than last, swift initiation of men and women as shipbuilders through a personal supervisory system goes far toward relieving the shortage of shipyard man power.

Robert Detmar never had been in a shipyard before he came to Federal. Through the shipyard's get-acquainted plan he found his proper berth in shipbuilding quickly. On the right Harry Fisher, sub-foreman in the machine shop, finds out that Detmar is "new" to shipbuilding, but not to marine activities, as he had been a shipboard machinist for nine years.

Marine Exchange NEWS of the MONTH



Above: Charles L. Wheeler.

Below: Commander Roy Ward, USCG.

MARINE EXCHANGE ACTIVITIES

By M. A. Cremer, Manager

Membership Growing

The membership of the Marine Exchange continues to increase in a most encouraging manner.

Applications for membership have been received during the past few weeks from the following:

C. W. Marwedel, Hickman Engineering Co., Royal Insurance Co. Ltd., Lyman Henry, General Paint Corp., Pacific Paint & Varnish Co., Garratt-Callahan Co. of California, Alameda Transportation Co., Goodyear Rubber Co.

Propeller Club Program

The Propeller Club's monthly luncheon meeting, held on April 19 at the St. Francis Hotel, was devoted to the Marine Exchange, which presented a specially prepared program.

The program consisted of a radio broadcast, which was recorded and put on the air over KGO on the following Saturday. It was replete with orchestra and sound effects.

The broadcast was the first of a series planned to develop popular support for the Merchant Marine. Directed at the San Francisco Bay area, it demonstrated: that California brought about repeal of the Chinese Exclusion Act by expressing itself individually and by resolutions; that the renewal of the reciprocal trade agreements, which greatly benefit the state's exports, almost failed because California did not express itself; and that there was need for the people to state forcibly that they favor maintenance of the Merchant Marine, since it spends in the state and in the bay area large sums of money for labor and services and can be a big factor in meeting the post-war problem of employment.

The program was prepared and staged by A. McKie Donnan, who in-

(Page 108, please)

Guests and members at the head table included, standing: Charles L. Wheeler, McCormick Steamship Co.; Frank O'Connor, California manager, Donavin Lumber Co., Abe Marks, veteran aide of the Marine Exchange; M. A. Cremer, manager of the Marine Exchange; McKie Donnan; Gene Hoffman, secretary of the Propeller Club. Seated: George Armes, General Engineering & Dry Dock Co.; Commander Roy Ward, U. S. C. G.; Miss San Francisco (Monica Whalen); Fred Doelker, president of the Club; and Dan Fazackerley, vice president, Junior Chamber of Commerce.

Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

A New Turbo Generator

Although a kilowatt is a kilowatt, whether delivered in Chungking, China, or Potlach, Idaho, there's a world of difference between the machines that produce it. In developing the new turbo-generator, the engineers of the Joshua Hendy Iron Works, Sunnyvale, California, have built a unit whose differences are claimed to place it well ahead of other plants in the marine auxiliary power field. These differences add up to new economy of operation and high overall efficiency.

The Hendy organization has been favored with a number of advantages in the development of its new turbine generator. An engineering staff of ranking men had been attracted by its war assignments, which included the building of engines for more than one-third of the Liberty ship fleet, the construction of 4000-hp and 8500-hp steam turbines for the U. S. Maritime Commission's cargo vessels, and the manufacture of many other essential power units.

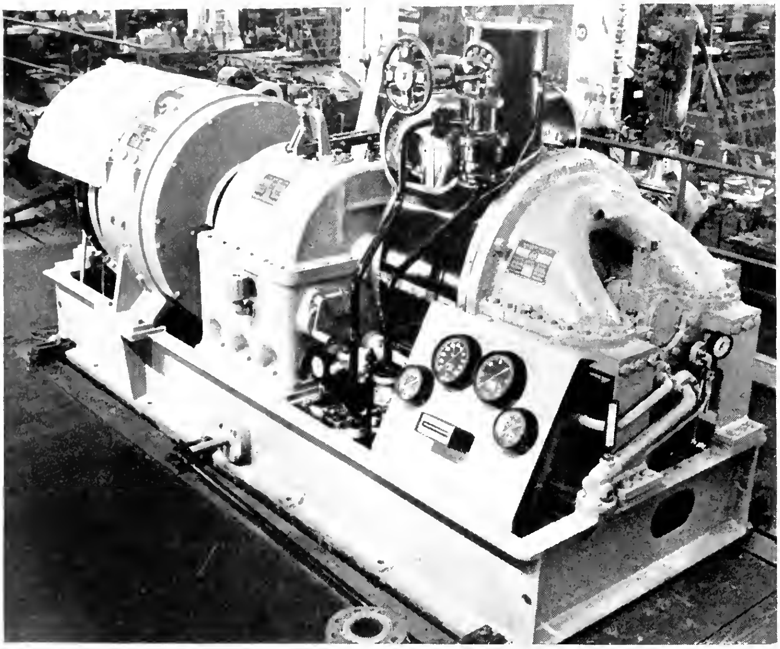
High standards of workmanship have been established. New methods of manufacture, new assembly techniques, and even new machine tools to do the job better and faster have been developed. New records have been established in the mass production of prime movers. All of this has been carried over into the building of the new turbo-generator.

Built for war service, the new auxiliary power unit had to meet the exacting reuirements of the U. S. Navy and the Maritime Commission Standardized Specifications. Its basic design covers a wide range of output, starting at 250 kw.

The modern trend toward simplification has been followed throughout in the design. The lines of the entire unit are clean with a smooth exterior.

The turbine has an economical water rate per kwh, insuring low operating cost. The backbone of the turbine is the large-diameter spindle with disks having large hub sections, assuring greater strength. Interstage seals are of the step-cut labyrinth type. The steel Rateau nozzle disks have welded-in, rolled stainless-steel nozzle blades and spacers. The governing system uses anti-friction bearings and is without stuffing boxes or soft packings, assuring accuracy and simplified control. Smoothness and compactness of design have been achieved without sacrifice of accessibility.

The reduction-gear case is of fabricated steel, smoothly finished with rounded corners. Rigidity is combined with light weight in its construction. External piping has been reduced to a minimum. The generator field yoke is formed of rolled steel plate, split on the horizontal centerline with the halves bolted together. It is of shock-proof construction,



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Send me descriptive data of the following new equipment as reviewed in your .... issue.

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which assures greater safety under adverse conditions.

The construction features of the turbo-generator are those normally found only in larger units. Thus larger factors of strength and safety, more economical operation, and higher overall efficiency are achieved.

Golden Rod Improves Electrode Holder

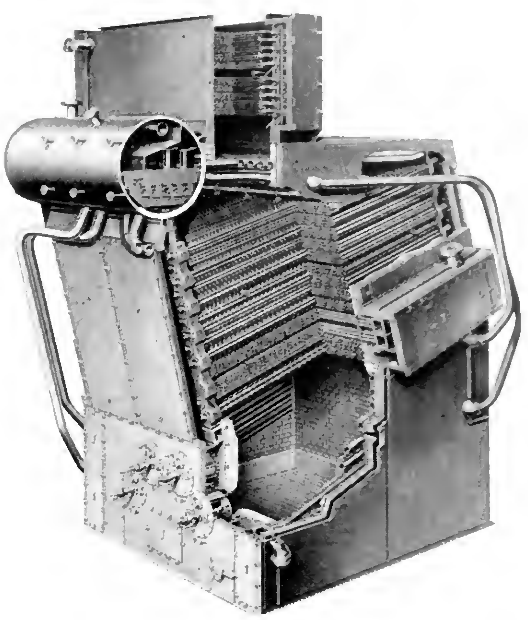
The Golden Rod Equipment Company's simplified electrode holder, which has been meeting with such remarkable success in West Coast industries, has recently been further improved. Weight has been reduced to 12 ounces, and all metal parts are now manufactured from brass, giving a high conductivity and assuring a cool holder.

The tip, which takes the brunt of the heat, has been redesigned and re-engineered, and is now molded from a high impact and high heat-resistant phenolic. It is now rounded on the end instead of flat for better metal shedding, and the sharp knurls at its base have been changed to smooth flutes. This makes for a more positive grip for the welder when adjusting the tip, and eliminates catches for metal beads.

This simplified electrode holder has no springs to lose their compression nor any handles or exterior gadgets to snag when dragged by the cable. It may be laid, suspended, or dropped on grounded surfaces without shortening or flare-backs, and as it is only one and a half inches in diameter, is excellent for drawing through small openings and for welding inside of pipe. Being fully insulated, it gives the welder excellent protection from burns, as there are no exposed metal parts to cause flashes. The holder is designed to handle up to ¼″ rod and will comfortably carry 300 amps.

In maintenance costs, some of Golden Rod's largest users report a saving of over 50 per cent. Man hours are reduced with the streamlined holder, as it is much easier to use in tight places as well as in ordinary welding, and further man-hours are saved in repairs, as it is usually only necessary to unscrew the worn-out stinger tip and replace it with a new one right on the job.

The electrode holder is distributed by the Golden Rod Equipment Co., San Francisco, California.



Single-pass header-type marine boiler.

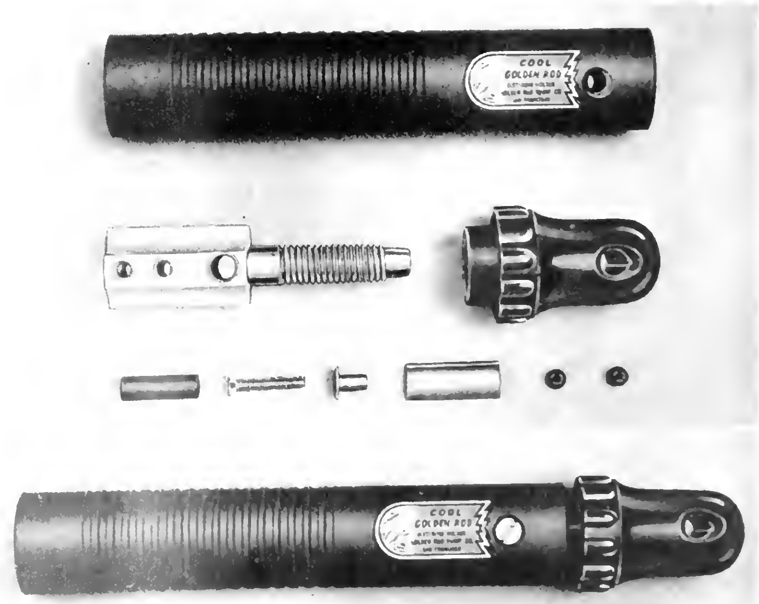
Boilers for Victory Ships

Boilers selected by the Martime Commission for the new Victory ships are of the single-pass, sectional-header type—a design that was originated and introduced by Babcock & Wilcox.

A large percentage of these new vessels are being equipped with boilers manufactured by B&W; there are two boilers per ship. Each unit includes B & W oil burners, water-cooled side walls, interdeck superheater, and a Babcock & Wilcox stud-tube economizer.

The efficiency of these units will be better than 87 per cent at full power operation, when evaporating 37,500 pounds of steam per boiler per hour at 465 pounds per square inch working presesure, and 750 total steam temperature at the superheater outlet, with feedwater temperature of 240 F. at the economizer inlet. The boilers are designed for operation at 150 per cent of full power capacity.

The boilers described above are being installed in AP-3 vessels. Similar units, of somewhat smaller capacity, are being installed in other Victory ships, the normal capacity being 26,500 pounds of steam per boiler per hour.



The new electrode holder has only nine parts in all. It is fully insulated and weighs 12 ozs.

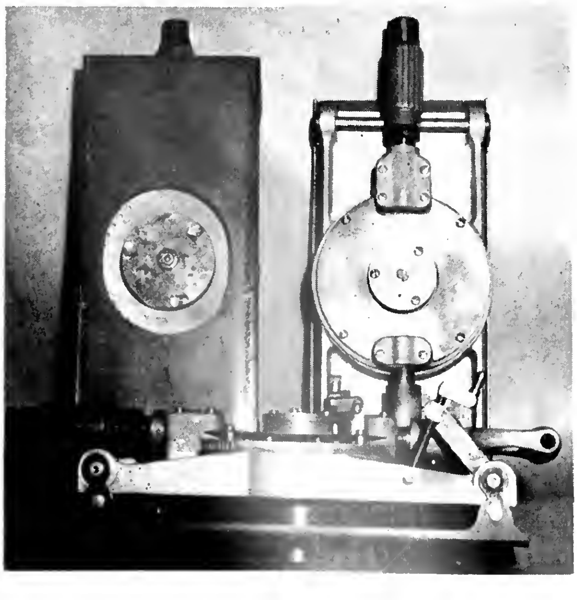
Pneumatic Aids to Wood Shipbuilding

The Buckner-Weatherby Co., Inc., of Seattle, announces the availability of two valuable pieces of equipment specially designed to meet present-day high-speed wood shipbuilding methods.

One of these items is a pneumatic caulking gun capable of efficiently caulking many times more seam in one day than can be finished manually by a skilled caulker. This gun, feeding either cotton or oakum, will both tuck and drive, and will deliver as high as 1000 strokes per minute, consuming 14 cubic feet of air per minute at 90 pounds pressure. The tool is strongly constructed of durable material and weighs only 13½ pounds.

The other specially-designed tool is a pneumatic planer or dubber, which is said to be setting new production records in the ten Northwest shipyards where it is in constant use. This planer drives a circular disk fitted with three blades, each set a different distance from the center of the disk. The disk revolves at speeds up to 18,000 rpm, and will rough a surface three and a half inches wide to a depth of 5/16 inches. The finishing head, which is furnished with each machine, is four inches in diameter.

The overall length is 18 inches; width, seven inches; height, four inches; and weight, 17 pounds. The blade rotor is mounted on two heavy duty precision SKF ball bearings, and rotor and cutter are dynamically balanced. The machine uses 35 to 40 cfm at 100 to 110 pounds air pressure on a half-inch line.



Toolmakers Open New Branch

Whitman & Barnes, popularly known as "Makers of Fine Tools Since 1854," recently opened a new branch at Los Angeles, California. A complete line of twist drills, reamers and other tools manufactured by this company will be kept in stock at all times to supply the demand of West Coast tool users.

E. L. Foreman is manager of the new branch. He was formerly manager of Whitman & Barnes New York branch. Previously he was connected with the factory at Detroit, Michigan. Lee W. Shetler will be Mr. Foreman's assistant in the Los Angeles and Southern California area.

B. J. Rohde represents the company in San Francisco and Northern California as well as in the states of Utah and Nevada. Oregon, Washington, Montana and Idaho are handled by W. H. Dick.

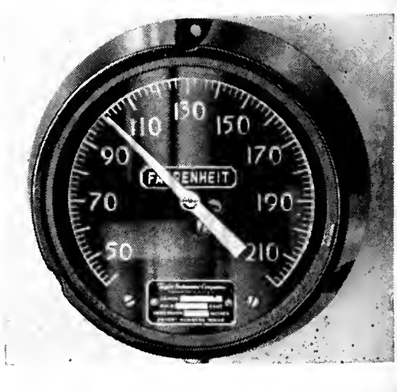
Dial Thermometer With Plastic Case

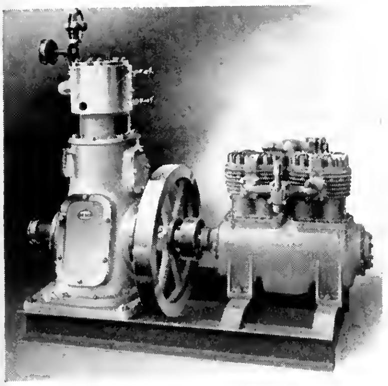
Originally built for and extensively used by the shipbuilding industry is Taylor's new 4½" Phenolic case dial thermometer. This mercury-actuated instrument is built to withstand severe operating conditions. Available with accurate tubing, it is especially well suited to installations requiring a long length of tubing between the bulb and the instrument.

The plastic case is resistant to corrosion and shock. To make reading at a distance easy, the metal dial is finished in black with white figures.

This 53K series mercury-actuated dial thermometer can be had with a wide variety of standard temperature-sensitive bulb constructions, and is available in the following ranges: —40° F. to 120° F.; 40° F. to 220° F.; 350° F. to 550° F.; 400° F. to 900° F.; —10° F. to 110° F.; 80° F. to 300° F.; 300° F. to 750° F.; 30° F. to 150° F.; 50° F. to 400° F.; and 200° F. to 900° F.

Right: Dial thermometer with plastic case.





Steam Engines for Reefer Plants

A simple, sturdy, economical steam engine for marine refrigeration, forced-draft blowers, circulating pumps and other uses, is available at Geo. E. Swett & Company, San Francisco engineers. Being locally built, prompt deliveries are assured.

This engine fills the need of additional refrigeration for ships' crews or troops that may be transported. It may be used for a completely-refrigated ship. Where the ship's electrical plant cannot carry an additional refrigeration load, or other loads, this engine can be easily installed. Its semi-automatic control is said to be ideal for ship refrigeration.

Geo. E. Swett & Company have 20 years' experience in designing and installing complete marine refrigeration. They have furnished about 80 per cent of all the new refrigeration installations and conversions in the San Francisco Bay area during the present emergency. Faced with the problem of obtaining deliveries on steam engines that could withstand the severe service required on ships, the company adapted a General Electric design and is now in quantity production locally, so as to assure prompt "launching" of any number of refrigeration plants.

Engines of this design, used singularly or in multiple, will furnish refrigeration of from 3 to 50 tons. Two sizes of engines meet all these requirements: 5″ bore, 4½″ stroke; 9″ bore, 7″ stroke; 225 pounds steam pressure.

Another use for these engines is where low head-room is encountered and additional horsepower is required. Two engines can be successfully coupled and operated with crankshafts set at 90 degrees, directly connected to a large CO_2 ice machine or a large Freon machine.

Fred Esser, of 30 years' refrigeration experience, is superintendent in chage of construction.

"Ship refrigeration calls for specialized application of refrigeration engineering," says Herb Southworth, chief engineer for the Swett company, "and our work of initial refrigeration or enlarging such plants is also based upon practical experience at sea. Marine equipment must be built to take more punishment. A failure at sea is serious. When our company enlarges a refrigeration plant or completely installs a new one we know that it will stand up under tough operation because our organization has a long history of first-hand operation aboard ships in all climatic zones. Our engines are built with this experience in mind, and while we carry a complete line of parts for these steam engines, we don't expect to replace any parts for long years."

Tanks and Related Products

Announcement of the establishment of Tivit Products Company, Los Angeles manufacturer of equipment for metal processing and cleaning, was made on March 10 by Bruce Wiswall, general manager of the new company.

Tivit is now manufacturing tanks, steam pressure cleaners, portable pressure spray tanks, and a number of specialized units, including bench-size tanks and spray booths for small parts cleaning; portable radiator flushers; steam syphon guns; and an automatic feeding injector hook-up known as "The Tivit Economy Steam Cleaner."

In addition to manufacturing its standard lines, the company builds tanks to specifications and maintains a field engineering service under the direction of M. P. Greffoz, which offers assistance in the designing, layout, construction and installation of solution tanks and other equipment for metal processing and industrial chemical operations.

Manufacturing Plywood

The Davis Hardwood Company, Bay and Mason Streets, San Francisco, announce that they are now manufacturing hardwood plywood and are able to supply sheets up to 48 by 96 inches in thicknesses ranging from 1/16 inch to full inch. Laminations are available in oak, birch, teak and ash, as well as other combinations prepared to order. This firm claims to be the only one in Northern California manufacturing hardwood laminations.

James Davis, general manager of the pioneer firm, which has been operating in San Francisco since 1913, pointed out that they also have a wide range of select hardwoods available for ship repair, conversion, and aircraft construction, including a large stock of lignum vitae, of which they are the largest suppliers on the Pacific Coast. The lignum vitae, which Mr. Davis selects personally on trips to the supply areas of Central America, is obtainable in either logs or blocks.

New Agitair Wind-Actuated Exhauster

Suitable for gravity and mechanical exhaust systems in marine industrial and commercial applications, this new wind-actuated exhauster gives positive ventilation regardless of wind direction or velocity. There are no moving parts, hence the exhauster gives long life with efficient service. The unit is weather-proof and light-proof, and provides positive elimination of down draft.

Many standard sizes are available, and special arrangements can be provided wherever required by the application. Units with water-tight dampers are made for marine use. These exhausters also function satisfactorily when installed as port-hole type ventilators.

Agitair ventilators are rigidly constructed and welded. Special finishes are applied for unusual salt or corrosive atmosphere applications. Available from Air Devices, Inc., New York City.

"Invasion" Gyro-Compass

The Navy Department has recently authorized a description and discussion of some of the uses of the new non-magnetic, lightweight "invasion gyro-compass," which employs the application of electronics.

Amphibious warfare calls for landing operations which must proceed on a fixed timetable despite hazardous coast lines, heavy surf and impaired visibility. These conditions indicated that a new compass had to be non-magnetic, unaffected by electrical machinery, ship's structure, or by cargoes of tanks, guns, trucks and jeeps.

Although gyro-compasses have been in use in the Navy, Merchant Marine and Coast Guard for over 30 years, radical changes in warfare required major changes in them to meet new conditions. So when the naval gyro-compass officers said to Sperry engineers, "We're going to need a lightweight gyro-compass for installation in a large fleet of small vessels with which to fight a phase of the war," plans which had been discussed between naval and Sperry compass experts as far back as 1921 were brought out for review.

Woman worker checks accuracy of the collector rings that supply power to the rotor and follow-up system. Rotor, which is spinning heart of gyro-compass, must turn up constant 10,000 rpm.

Below: The water test. The rotor casing encloses a near-vacuum. In this test it is filled with compressed air and submerged. If bubbles appear it is faulty.

A small compass that had been built and tested under the supervision of Eric C. Sparling and William H. Hight in 1921 was modified with respect to an improved mercury ballistic and the substitution of an electronic follow-up system for the old trolley-contactor system. These and other refinements took months of tedious designing, building sample models, testing them on "torture machines" on shore and putting them through elaborate tests at sea. The result was the "Sperry Mark XVIII," now in production; and not only at the Sperry plant, for the designers at the same time assisted another manufacturer to get into production to help meet the demand that—when it did come—came almost overnight.

The first of the Mark XVIII "invasion compasses" was turned over seven months ahead of promised delivery. There was in this achievement an outstanding example of Navy foresight and industrial cooperation.

The new compass stands at normal height but is only 19 inches in diameter. It is remarkable in that except for the voltage regulator and the repeaters, all items of equipment, including the control panel, amplifier panel and motor generator, are contained within the binnacle. The repeater system employs the same repeaters as the familiar Sperry Mark XIV Merchant Marine type gyro-compass.

When installed on smaller vessels there is a further ingenious modification. Because of extreme space limitations, the binnacle is split into upper and lower halves and placed in different locations on the ship. The top half with the sensitive element—the rotor and mechanism that actually do the job—may be installed at the steering station where it can be seen by the helmsman, and the bottom half, with the control panel, amplifier panel, filter and motor generator can be located some distance away where more space is available.

The new Sperry Mark XVIII Gyro-Compasses are in use today in various types of landing craft and submarine chasers, and on some merchant vessels.

Hot off the Press

Air Devices, Inc., of New York, has published a bulletin on its Agitair products. The bulletin gives information on air diffusers, heavy-duty ranges, bake ovens and stoves, air exhausters, air filters, hot water generators, heat baffles and oil burners, and hot gas generating furnaces.

• • •

"Flow Meter Engineering," reprint No. 29, is a 16-page booklet issued by the Cochrane Corporation of Philadelphia, Pa., and explains why, when and where flow meters and instruments are needed in the modern plant. The reprint also includes helpful hints for keeping instruments out of the repair shop, and devotes two pages to details of proper installation methods.

• • •

A new air circuit breaker catalog, No. 1002, obtainable from the I-T-E Circuit Breaker Co., Philadelphia, Pa., includes sections covering the selection and construction of this company's low-voltage air circuit breakers. A section on protective devices is included, describing many types of tripping mechanisms available. Individually enclosed circuit breakers, switchboards and automatic reclosing circuit breakers are shown and briefly described.

• • •

The New Jersey Zinc Company has printed a booklet entitled "Properties and Uses of Zinc Borate-3167," covering the subject of fire resistance. This booklet includes a review of the present practice of fire resistance, with emphasis on resistance to mildew, weathering, water and other solubilizing agents. It goes into the general physical and chemical properties of this product and its applications.

• • •

"Marine Operators' Manual," published by the Elliott Company of Jeannette, Pa., covers deaerating feedwater heaters and the principles of their operation. This 24-page manual, Bulletin 101, provides instruction covering power plants in general and deaerating heaters aboard steamships built under the supervision of the U. S. Maritime Commission. A large typical flow diagram of a ship's power plant is separately provided, for detailed study, in the pocket inside the back cover.

• • •

Wire Rope Conservation Bulletin No. 43-85, prepared by Macwhyte Company, manufacturers of wire rope, Kenosha, Wisconsin, consists of a series of illustrated articles on wire rope conservation to help the consumer conserve wire ropes and help conserve on the country's steel.

Macwhyte Wire Rope, catalog G-15, is a handy guide to the proper selection of wire rope in all lines of industry.

"Fundamentals of Electronic Control for Resistance Welding" is the title of General Electric's new 46-page booklet (GET-1170). It contains articles by the company's engineers on the circuits and operation of electronic controls for resistance welding. Simplified circuit diagrams are shown explaining the fundamentals of the many types of electronic controls available to meet the exacting requirements of individual welding processes.

• • •

Ilg Portvente, electric porthole ventilator for triple-duty aboard ship, is described in the new bulletin put out by the Ilg Electric Ventilating Co., Chicago. This bulletin contains complete information, along with dimensions, specifications and performance graphs.

• • •

Burndy Engineering Co., Inc., of New York has recently published a catalog introducing the "indent" principle of installing electrical Hydent connectors, used widely in the marine, aircraft, electronic and electrical manufacturing industries.

• • •

Westinghouse Electric & Mfg. Co., Sharon, Pa., has printed three new data sheets on Marine Dry-Type Transformers for switchboard applications. These bulletins are Nos. B-3302, B-3303, and B-3304.

• • •

A fully illustrated bulletin issued by Struthers Wells Corporation, Titusville, Pa., Forge Division, presents the story of the company's facilities for producing heavy steel and alloy forgings, lines shafts, thrust shafts, crankshafts, etc., and is amply illustrated.

• • •

"Carbon Seal Rings" is the title of an illustrated booklet, dealing with carbon seal rings and their application to the bellows type shaft seals, just released by the Pure Carbon Co., St. Marys, Pa. This bulletin features the BH 1 and T-2 grades of seals recommended on automobile water pumps.

• • •

"Whiting Automatic Welding Cranes," a two page illustrated bulletin, Unit 68, has been published by Whiting Corporation, Harvey, Illinois, describing their special automatic welding cranes—a design developed by the firm's engineers to facilitate the handling of large welding jobs.

On the Ways—

SHIPS IN THE MAKING

Merchant Ships Delivered

With the delivery of 152 ships in March, totaling 1,538,357 deadweight tons, the Maritime Commission shipyards have delivered 410 vessels, totaling 4,115,951 deadweight tons, during the first quarter of 1944. The first quarter of 1943 saw delivery of 379 vessels, totaling 3,757,405 deadweight tons.

The majority of ships turned out were of the Liberty type, with 83 put into service, but the trend toward construction of military and other fast vessels was again evident, as a total of 51 of the fast types was delivered. Four Victory ships, a speedy type now coming into production, were delivered by the Oregon Shipbuilding Corporation, Portland, Oregon. Nineteen standard tankers and 16 C-type vessels of the long-range program also were placed in service. In addition, 21 special type vessels were delivered to the armed services.

West Coast shipyards delivered 70 vessels, totaling 674,019 deadweight tons, which include four Victory ships and 17 special types, or 43.8 per cent of the total deadweight tonnage for March. The East Coast produced 47 ships, totaling 533,241 deadweight tons, seven of them special types, which was 34.7 per cent of the total tonnage. Gulf Coast delivered 34 vessels, totaling 330,097 deadweight tons, to reach 21.4 per cent of the total tonnage. The other 0.1 per cent was built by the Great Lakes, one ship of 1000 deadweight tons.

The number and types of vessels built by all yards follow:

SHIPYARD	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co.	3	Tankers
Avondale Marine Ways, Inc.	1	Coastal Cargo
Barrett & Hilp	1	Concrete Barge
Bethlehem-Fairfield Shipyard, Inc.	14	Libertys
Bethlehem-Sparrows Point Shipyard, Inc.	1	Tanker
California Shipbuilding Corp.	6	Libertys
Concrete Ship Constructors	1	Concrete Barge
Consolidated Steel Corp., Ltd.	5	C-1 Cargo
	4	Special Type
Delta Shipbuilding Co., Inc.	6	Libertys
Federal Shipbuilding & Dry Dock Co.	2	Special Type
Houston Shipbuilding Corp.	7	Libertys
Ingalls Shipbuilding Corp.	1	C-3 Cargo
	1	Coastal Cargo
J. A. Jones Construction Co., Inc.	4	Libertys
J. A. Jones Construction Co., Inc.	5	Libertys
Kaiser Cargo, Inc.	3	Special Type
Kaiser Company, Inc.	3	Special Type
Kaiser Company, Inc., Swan Island	5	Tankers
Kaiser Company, Inc., Vancouver, Wash.	5	Special Type
Leathem D. Smith Shipbuilding Co.	1	Special Type
McCloskey & Co.	2	Concrete Cargo
Marinship Corp.	4	Tankers
	2	Special Type
Moore Dry Dock Co.	4	C-2 Cargo
North Carolina Shipbuilding Co.	5	C-2 Cargo
New England Shipbuilding Corp.	9	Libertys
Oregon Shipbuilding Corp.	4	Victory Cargo
Pennsylvania Shipyards, Inc.	1	C-1 Cargo
	2	Coastal Cargo
Permanente Metals Corp.	23	Libertys
St. Johns River Shipbuilding Co.	4	Libertys
Southeastern Shipbuilding Corp.	4	Libertys
Sun Shipbuilding & Dry Dock Co.	6	Tankers
Todd-Galveston Dry Docks, Inc.	1	Coastal Tanker
Walsh-Kaiser Company, Inc.	1	Special Type
	1	Liberty

FOURTH VICTORY SHIP

High over Calship's outfitting dock looms the steel bow of the yard's fourth Victory ship, the S. S. United States Victory.

Calship Produces Victory Types

Liberty ships and Victory ships "moved over" on Calship's 14 shipways to make room for the yard's first Victory-type transport ship.

Of the 84 Victory-type vessels for which the California Shipbuilding Corporation holds contracts, many will be converted into transports.

The keel laying for the first transport ship was accomplished without fanfare or ceremony in early morning hours of March 28, shortly after the launching of the yard's seventh Victory ship, the S. S. Mexico Victory. News of the keel laying was withheld several days by request of the Maritime Commission's regional public relations office.

Since late last year the big Terminal Island shipyard has been turning increased effort toward building the new Victory-type merchant ships and at present is approaching full-yard production of the vessels.

With the launching of the S. S. Martin Johnson at midnight on April 14, the California Shipbuilding Corporation yard on Terminal Island neared completion of its enormous Liberty ship contract with the Maritime Commission. The S. S. Martin Johnson, named for the famous photographic explorer of African wild life, was being outfitted at the yard's dock, and is the 306th Calship Liberty freighter. Calship also has built 30 Liberty tankers.

First to Fly "S" Pennant

First American shipyard to fly the green and white pennant, the California Shipbuilding Corp. yard proudly displays a huge new banner, the National Safety Council's "S" pennant, awarded for "Distinguished Service to Safety."

The award was based on the yard's steadily declining accident frequency rate and consistently high production through 1943. The downward trend in the accident frequency rate continued also through the first three months of 1944, reaching a new low of 9.1.

Awarded Contract for Diesel-Generating Plants

Green light for the immediate production of a large number of new type diesel-generating plants has been given the Joshua Hendy Iron Works by the Maritime Commission, according to an announcement by Chas. E. Moore, president of the firm. The units are scheduled off the production line at the rate of 22 per month by the end of the year.

To develop 250 kilowatts each, these plants consist of Series 50 Hendy diesel engines and Crocker-Wheeler direct-current generators, mounted on bed-plates. Crocker-Wheeler is the electric manufacturing division of Hendy, with headquarters on the Atlantic Coast.

These units are for use on the AV-1 type of Maritime Commission ships, and will provide the electric current for general ship-board services. Engines to drive the generators are six-cylinder units, with a bore of 12″ and a stroke of 15″. Among the features of the engines are the dual intake and exhaust valves, unit type fuel injectors, and welded-steel construction of the bed-plate, cylinder block and crankcase.

Marinship Wins Tanker Flag

National shipbuilding honors came to San Francisco Bay area when Marinship, Sausalito shipyard, was notified that it had won the National Tanker Champ Flag on the basis of March production.

K. K. Bechtel, president of the yard, was notified in a wire from Rear Admiral Howard L. Vickery, vice chairman U. S. Maritime Commission, that Marinship's record of four large tankers delivered in March out

TANKER CHAMP FLAG AWARDED

Five thousand workers cheer as the national Tanker Champ flag is presented to Marinship, Sausalito (Calif.), shipyard, by the United States Maritime Commission. Led by the Fourth Army Band, a parade of workers joined in the ceremonies signalizing the yard's defeating every other U. S. shipyard in building of tankers in March. Marinship's 15,000 workers delivered four 10,000-horsepower tankers during the month. *(Photo courtesy Marinship)*

distanced all other tanker construction yards in the nation.

Marinship excelled the production records for March set by Kaiser Co. at Portland, Oregon; Alabama Dry Dock and Shipbuilding Co. of Mobile, Alabama; and Sun Shipbuilding and Dry Dock Company of Chester, Pa. This was done in spite of the fact that 15,000 men and women of Marinship are building a more powerful and more complicated tanker than is now being built in any other tanker yard.

These tankers are the fastest commercial tankers ever built, being powered by 10,000-hp turbo-electric motors.

In an effort to retain the Tanker Champ flag, Marinship has set a goal of delivering three ships in April and four in May.

S. S. SEA QUAIL LAUNCHED

Ingalls Shipbuilding Corporation recently released another huge all-welded ship at its Pascagoula yard for war service. The Sea Quail, sponsored by Mrs. Claude Pepper, wife of the Florida senator (center), is shown with the launching party, which included, left to right: Mrs. R. I. Ingalls, Jr.; R. I. Ingalls, Jr., vice chairman of the company; L. R. Sanford of the Maritime Commission; Senator Homer L. Ferguson of Michigan; Mrs. Jack Simmons, matron of honor, Tallahassee, Fla.; and Senator James E. Murray of Montana.

DESTROYER ESCORT LAUNCHED

The U. S. S. Damon M. Cummings goes down the ways at the San Francisco shipyard of Bethlehem Steel Company, 42nd combat vessel built there since 1939. She was launched on April 18, and was sponsored by Mrs. Charlotte Ellis Cummings, widow of the late Lieut. Comdr. Cummings, in whose honor the vessel was named.

With her son watching, Mrs. Cummings breaks a bottle of champagne on the prow of the Cummings.

Troopship Launched at Bethlehem-Alameda Yard

U. S. S. Admiral R. E. Coontz was launched at the Bethlehem-Alameda Shipyard on April 22, and was sponsored by Mrs. Edwin Kokko of Seattle, Washington, daughter of the naval officer in whose honor the vessel is named.

Admiral Robert Edward Coontz served over 40 years in the U. S. Navy, was Chief of Naval Operations in 1919, and served as one of the chief expert advisers to President Harding at the Washington disarmament conference in 1922. He died on January 26, 1935.

This ship is the third of its class to be launched at this yard, and is of a type rated as among the largest commercial vessels built on the Pacific Coast. It is to be one of the new speedy troopships for coming operations, but figures about its speed and carrying capacity are not given out.

Colorful California Figures Honored

The early days of Alaska seal hunting were recalled when, on April 3, the S. S. Louis Sloss slid down the ways of shipyard No. 2, Richmond, California.

Louis Sloss, for whom the ship was named, was a civic and business leader, organizer of the pioneer Alaska Commercial Company, and active through his company in sealing operations in the Alaska and Bering Strait areas. He was the father of Judge M. C. Sloss, former member of California State Supreme Court.

One of the most colorful San Francisco pioneer sea captains and one of the founders of the General Steamship Company was honored at the christening of the S. S. William Schirmer, launched at Permanente Metals Corporation shipyard No. 2 late in March.

As a youth, Captain Schirmer sailed before the mast on American clipper ships, coming around the Horn to California at the age of 15 in 1873. He sailed out of Pacific Coast ports for a quarter of a century, finally coming ashore to engage in shipping operations. He introduced improvements in the methods of loading and discharging cargoes.

More recently the name of George Clement Perkins has been assigned to a Liberty ship hull at Perm-Metals. He was born in 1839 at Kennebunkport, Maine, later becoming a successful merchant of San Francisco. He was a member of Goodall, Perkins & Co., afterwards Pacific Steamship Co., and the first to introduce steam whalers in the Arctic Ocean. He was Governor of California from 1879-1883, and served as U. S. senator in 1893, 1895, 1903 and 1909.

York to Equip Invasion Craft

The nation's newest and fastest type ship for landing infantry and mechanized equipment will be outfitted with refrigeration by the York Corporation.

Refrigerating equipment for meat and vegetable compartments will be installed on two types of self-propelled barges, the LSM (landing ship mechanized) and the LCI-L (landing craft infantry-large).

Not yet in service, the LSM was created to provide for speed in transporting infantry for landing operations. One of the fastest of all such vessels, it will weigh several hundred tons and have a transoceanic cruising range. Tremendous deck area and a minimum of superstructure make the LSM ideally suited for carrying, in addition to troops, cargoes of tanks, planes and other mechanized equipment. The LCI's, which will also be equipped with refrigeration, range in size from 100 to 200 feet and are mainly used to transport foot troops.

General Engineering Launches Mine Sweeper

The U. S. S. Refresher, a fleet mine sweeper, was launched on April 12 from the General Engineering & Drydock Co. yard in Alameda, California, the Navy recently announced.

The vessel was sponsored by Muriel Maddox, daughter of Captain Charles H. Maddox, USN, communications officer, Eastern Sea Frontier.

Lame-Duck Makes Port

Teamwork of the merchant crew and Navy gunners, together with calm, clear thinking by her master, enabled the American war freighter Richard Olney to survive torpedoing and save her military cargo off Italy. She has been operated for the War Shipping Administration by the Marine Transport Lines, Inc., after delivery from the Delta Shipbuilding Co. Inc., New Orleans, in February, 1943.

In spite of three broken ribs suffered in a North African blackout, Captain Erich Richter of Brooklyn, New York, sailed her in convoy. On the second day out a torpedo crashed into the engine room, killing two members, injuring several others and completely crippling the ship.

The master surveyed the damage, assured the crew that the Liberty could remain afloat, and sent an SOS for a convoy escort vessel and a doctor for the wounded. The escort arrived shortly, a towline was secured and the ship was towed to a North African port and beached.

The injured were taken ashore and the entire cargo was transferred to another Libety ship, the John Fiske, and carried to its destination. The captain and four volunteers remained at their stations aboard until relieved by a shore guard.

Fortieth Combat Ship Launched at Bethlehem

When the U. S. S. Putnam, Navy destroyer, slid down the ways at the Bethlehem plant in San Francisco on March 27, the company announced completion of the 40th combat vessel to be built in the San Francisco yard.

The Putnam was named in honor of Master Charles Flint Putnam of the United States Navy, who lost his life in 1883 on a rescue mission in the Arctic regions.

20,000-Ton Troopship Launched

U. S. S. General Mark L. Hersey, a 20,000-ton troopship, was launched on March 31 at Kaiser Company, Inc., Shipyard No. 3, in Richmond. Included in the launching party were Miss Agnes O. Hersey, 72, social worker in a war plant at New Britain, Connecticut, who arrived in the San Francisco Bay Area to participate as maid of honor at ceremonies for the ship named in honor of her renowned brother. Mrs. Alice Hersey Wick of Allentown, Pa., daughter of General Hersey, acted as sponsor.

LAUNCHING AT KAISER CO.

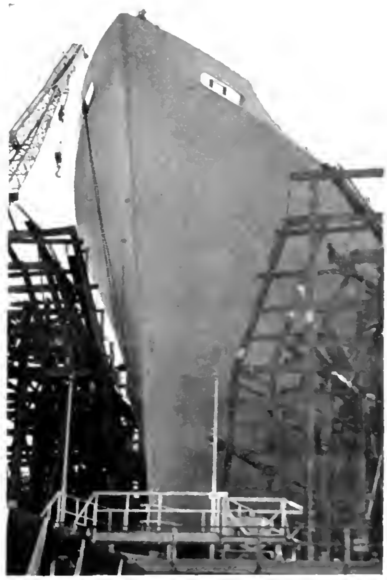
On April 1 the General Mark L. Hersey was launched at Shipyard No. 3 of the Kaiser Co., Inc., Richmond, California. Mrs. Richard M. Wick was sponsor.

Consolidated Launches First BD-1 Transport

With the launching on March 28 of the first BD-1 troop transport ship in the entire country, Consolidated Steel announced that all the facilities of its huge Wilmington shipyard have been switched over to the production of these fast twin-stack combat vessels for the U. S. Navy and the U. S. Maritime Commission.

Three times as costly as a Liberty ship and precise as a watch, the high-speed turbine-propelled transports are considerably larger and more complicated than the C-1 long-range cargo-and-passenger ships, for the construction of which the Consolidated yard recently won the Maritime Commission's highest award, the Maritime Eagle pennant.

Sponsor of the sleek new-design vessel was Mrs. Arthur Williams, wife of the Ways Superintendent at Consolidated's Wilmington Yard. Her maid of honor was Mr. and Mrs. Williams' sixteen-year-old daughter, Frances.



LAUNCHING OF U.S.S. GILLIAM

The center picture shows the bow of U. S. S. Gilliam ready for launching from the ways of Consolidated Steel Corporation, Ltd., Wilmington Shipbuilding Division, on March 28.

Right: Left to right: Commander Olson, Mrs. Williams, Art. Williams, Frances Ruth Williams, C. W. Lee.

MARINE EXCHANGE NEWS

(Continued from page 97)

dividually is credited with having done most to develop the public support that resulted in a deluge of letters and resolutions to congressmen demanding repeal of the Chinese Exclusion Act. Participating in the program were Charles L. Wheeler, executive vice president of the McCormick Steamship Company; Commander Roy C. Ward, president of the Marine Exchange; Gene Hoffman, director of public relations of the American President Lines; and Don Fazackerley, chairman of the Bay Area Maritime Committee.

Meiggs Wharf Moved

On Saturday, May 22, the Junior Chamber of Commerce staged a rededication of Meiggs Wharf at the new site of the Marine Exchange harbor lookout station.

The station is now located at the foot of Hyde street. Originally located at Meiggs Wharf in the nineties, the station moved westward when the wharf was abandoned and the sea wall extended. Since those early days, wherever the lookout station was located has been known as Meiggs Wharf.

The new station consists of a two-story building recently built by the Board of State Harbor Commissioners. From this station the Exchange operates its launch, the Jerry Daily, to deliver docking instructions to arriving vessels, and to report arrivals, departures and harbor movements, as well as a number of other services, all on a 24-hour basis. These and other reporting activities of the Exchange are carried on under the supervision of the Director of the Port of the 12th Naval District.

The festivities included a buffet luncheon at the South End Rowing Club; an invocation by Rev. John Lanane of the Apostleship of the Sea; a greeting from Commander Roy C. Ward, Exchange president; and a brief reminiscing talk by Ralph Myers, president of the Shipowners Assn. of the Pacific Coast, and an inspection of the new station.

Exchange Floor Exhibit

Invasion tactics were graphically portrayed by sound films, models and pictures at the Marine Exchange Floor during the last two weeks of April.

Provided by the British War Information Services, the exhibit proved not only timely but highly entertaining. The sound films portrayed actual commando raids on the Norwegian coast, while the Dieppe raid was depicted by a well-wrought illuminated model.

Bay Area Maritime Committee

At their regular monthly meeting on April 18, members of the Bay Area Maritime Committee drew attention to the apparent lack of preparation for repairs for the large number of ships now completed. Whereas a graph of ship construction follows a steep rising incline, that for repairs is at a much lower rate of ascent.

The large number of ships anchored in the stream awaiting repairs, and the inordinately large number berthed at cargo piers and there undergoing repairs, was regarded as an extremely unhealthy condition.

It was pointed out that although the need for using all the cargo-handling facilities throughout the bay area for handling cargo only was pointed out by the committee close to two years ago, and while the need for additional means to conduct repair operations was being generally discussed publicly by Federal officials one year ago, there is still a good deal more talk than action to meet what is already a very serious situation. The situation, some said, is more dangerous than appears on the surface, since there is not apparent, at least, any plan to provide what is an immediate, much less a greater, future need for berths where workmen and materials can gain access to ships needing repairs. It was emphasized that while there were plans for future provisions, the need was extremely urgent for immediate action.

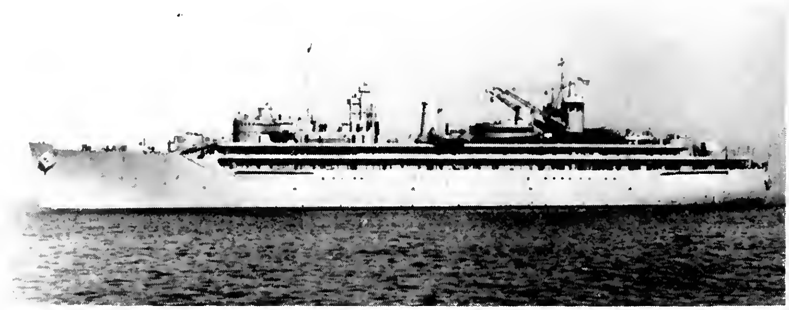
The committee determined to look further into the possibility of securing additional repair facilities at an early date.

Diesel-Drive Tenders

A new era in the powering of the heavier type of warship with diesel engines has been disclosed by George W. Codrington, vice president of General Motors and general manager of the Cleveland Diesel Engine Division. The announcement was made concerning the use of the General Motors diesel-electric drive in seven new submarine tenders. Each of these vessels has a displacement of 16,000 tons.

The new submarine tender is powered with eight 16-cylinder, 2-cycle GM diesel engines. Each engine is capable of developing 1600-horsepower. Four of the engines are used exclusively for supplying power to the propulsion motors, while the other four supply power to the ship's auxiliary motors. The engines may be alternated for the main propulsion equipment or for the auxiliary equipment.

U. S. S. Fulton, one of the Navy's new 16,000-ton submarine tenders. Other ships of this class are the Sperry, Bushnell, Neptune, Nereus, Orion and Proteus.
(Official U. S. Navy photograph.)



Running LIGHTS

Who When Where

Edited by B. H. Boynton

Islands Welcome National Propeller President

From the Hawaiian Islands comes the report that the Propeller Club, Port of Honolulu, held its annual meeting on February 22, at the lovely home of Earl Thacker, president of the Club. Of particular interest was the attendance of Captain R. C. Lee, USNR, National President of the Propeller Club of the United States, who was in the Islands for a short visit on Naval duties.

J. J. Murphy, Hawaiian Manager for the American President Lines, Ltd., was nominated for the presidency of the Club. A few hours before the meeting, he had to leave for the mainland, and to the amusement of the members, he was elected President of the Port just as he was passing overhead in the Clipper bound for San Francisco.

Seated here at the head table are representatives of the Electrical, Civil and Mechanical Engineers' Societies, Commander Kransfelder, USN, Commander Kell, USN, and George E. Swett.

Birth of

NORTHERN

We are glad to record the birth of the Pacific Coast's first section of the Society of Naval Architects and Marine Engineers—an event which was celebrated with great enthusiasm by a large group of Northern California members and their guests at a dinner in the Engineers Club in San Francisco, on April 21.

For some months prior to this gathering, a representative committee of members had been fabricating and sub-assembling the framework for this new craft. This committee consisted of George E. Swett of Geo. E. Swett & Co., chairman; Eugene R. Spunn of Matson Navigation Co.; Richard J. Hischier of Moore Dry Dock Co.; William B. Warren of American Bureau of Shipping; J. S. Hines of Pacific Marine Review; C. M. LeCount of General Electric Co.; and M. Weitzner and H. P. Stewart of the Shipbuilding Division of Bethlehem Steel Co.

This committee carried on correspondence with the parent society at New York, cleared a proposed set of by-laws for the local section and selected, contacted and secured acceptance of nomination from a group of officers and executive committeemen. They appointed a provisional committee on technical papers to get ready for future technical sessions and arranged the initial dinner.

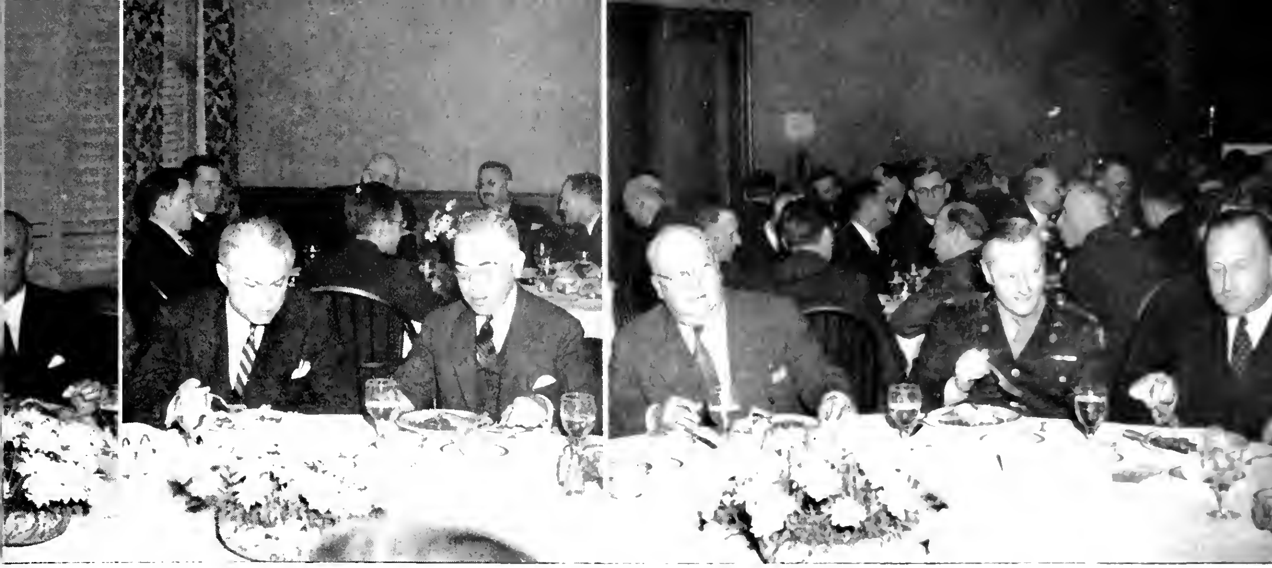
This dinner brought out a full house. One hundred and sixty-five men attended. Under the able provisional chairman, George Swett, the meeting got under way and the by-laws were unanimously adopted. These by-laws set the name for the new baby as "Northern California Section of the Society of Naval Architects and Marine Engineers," lay down rules for election of officers and committees, and describe the connection with the parent body.

The report of the nominating committee was read and by unanimous vote the secretary pro tem, H. P. Stewart, was directed to cast a ballot for: George K. Nichols, of Matson Navigation Co., chairman; Captain Edgar Kranzfelder, U. S. N., vice chairman; C. M. Le Count, of General Electric Co., secretary treasurer; and, George E. Swett, Lieut. Col. J. R. Reilly, U. S. A., M. Weitzner and M. Jaehne of Standard Oil Company of California, executive committee.

There were, as of January 1, 1944, some 135 members of the parent society living in Northern California. Among these were 15 who had been members for 25 years or more. Ten of these attended the meeting. One absent old timer was Dr. Durand of Stanford University, a charter member of the society, who in his 85th year is at Washington, D. C., serving on some of the most important technical committees of the war services.

Visitors from the parent society at New York were J. Lewis Luckenbach, president of the American Bureau of Shipping, and J. H. King, secretary-treasurer of the Society of Naval Architects and Marine Engineers, each of whom expressed congratulations and best wishes in a few well-chosen

In the far left: Captain Albert Pillsbury, E. B. Hill, Edson B. Schack, Austin Sperry and James A. Thompson.



(Left to right): George Nichols, Carl W. Flesher, regional director of the U. S. Maritime Commission, J. H. King and J. Lewis Luckenbach from New York, Captain Reilly, USA, and Herbert A. Sawin, president of the Engineer's Club.

Coast Technical Society

CALIFORNIA SECTION OF S. N. A. M. E. CREATED

words. Seated at the speakers table were H. W. Sawin, president of the Engineers Club, and the respective chairmen of the local sections of the Mechanical Engineers, the Civil Engineers, the Electrical Engineers and the Mining Engineers.

The keynoter of the evening was Captain C. O. Kell, U. S. N., Supervisor of Shipbuilding at San Francisco, who made a very earnest plea for lifting the technical standards of the professions around which the society is built. "The main object of this local section," said he, "is to gather together many active minds that have become associated with this profession in this region and give them opportunity to question and to discuss and to express their ideas. This will become increasingly important as the center of war effort comes to be concentrated in the Pacific."

This meeting was a very evident success. The speakers held the minds of the audience to a note of high technical standards. There were many reunions of old buddies who had not contacted each other in years. Everything was done without haste and smoothly, and the program was over at 9:15 p.m. We predict that those who attended will be looking forward eagerly to the next session.

Upper right, left to right: M. Weitzner, Bethlehem Steel Co.; H. P. Stewart, Bethlehem; C. M. LeCount, General Electric Co.

Right, left to right: W. M. Loughton, of Potrero Branch of Bethlehem Steel Co.; M. W. Jackson, U. S. Maritime Commission; and, Daniel Ring, U. S. Maritime Commission.

During the charter presentation, Arthur M. Tode, honorary president of the Propeller Club of the United States, discussed the activities of the Club's new Student Port at San Mateo to the assembled Cadet-Midshipmen.

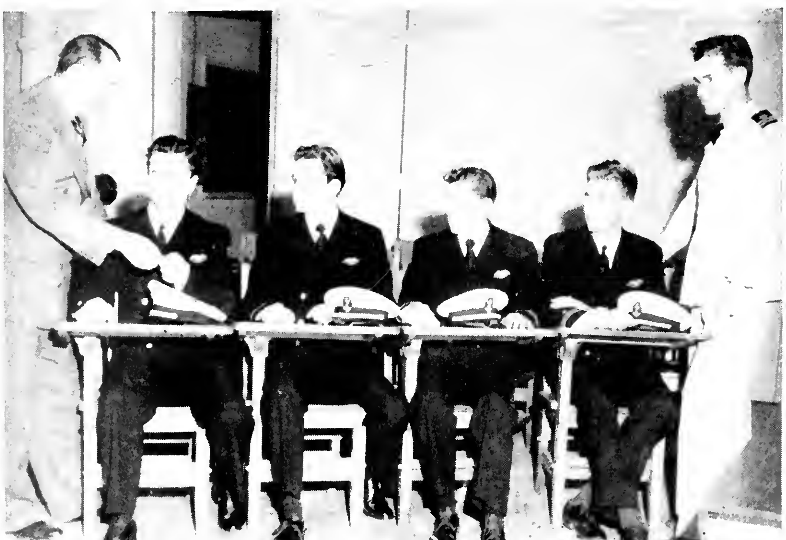
Cadet School Receives Charter

Impressive ceremonies were held at San Mateo, California, U. S. Merchant Marine Cadet Basic School, when the base formally received its charter as a Student Port of the Propeller Club of the United States. On hand to make the presentation and address to the assembled Cadet-Midshipmen were numerous officers of both the National Propeller Club and of the San Francisco Port, namely, Arthur M. Tode, honorary president; Hugh Gallagher, member of the Board of Governors, and Harry Parsons, past president, representing the National Organization, while Fred Doelker, president, and Gene Hoffman, secretary and treasurer, represented the San Francisco Port.

The presentation of this Charter and the establishment of a Student Port at San Mateo should be, to the Cadet Corps, an indication of acceptance by the shipping industry. It should furnish evidence that the American Merchant Marine is gathering its strength for the fight to retain its position. Obvious, too, is the fact that the industry is counting on the aid and support of the Cadet-Midshipmen in this program to help fight for the maintenance of an adequate and powerful Merchant Marine.

Commander B. M. Dodson, USNR, Commanding Officer of the Cadet Basic School at Pass Christian, attended the ceremony as a guest of Commander Ralph Sheaf, USNR, Commanding Officer of San Mateo, and Lieut. Comdr. John Kucin, USNR, Executive Officer of San Mateo.

Mr. Tode presenting membership card to M. H. Foskett, president of the Student Port; A. R. Southwick, treasurer; Delmar L. Kolda, vice president; Ray V. Alfsen, secretary; while Lt. (jg) John F. Summerill, USNR, Faculty Adviser, looks on.

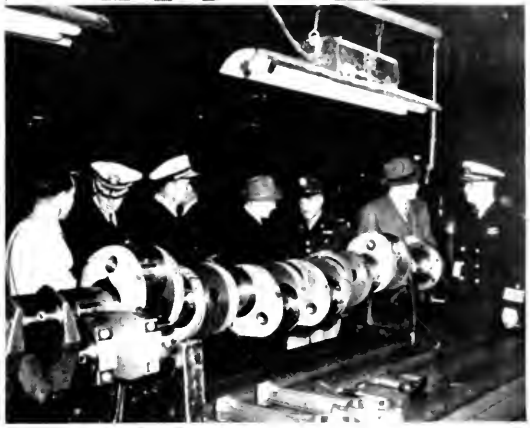


Northwest Plant Announces Repair Facilities

The Puget Sound Bridge & Dredge Company at Seattle, Washington, announced in March its entry into the field of ship repair and conversion, supplementing the announcement with an outline of postwar plans for the construction and operation of a large ship repair yard.

In an exclusive interview with representatives of Pacific Marine Review, President H. W. McCurdy and Vice-President Raymond J. Huff disclosed that they plan to turn their entire operations over to ship repair and conversion at the end of the war. However, present conditions make it impossible to tell more about the plan.

The company was founded in 1889 and has been in continuous operation. The firm has constructed repair barges, dredges, towboats, lighters, and small ships; has completed an outstanding job with the construction of 26 reinforced concrete pontoons for the world famed Lake Washington floating bridge, which displaces 100,000 tons and is the largest floating bridge in the world. The firm built Seattle's Harbor Island, and has done approximately 90 per cent of the filling on the Seattle waterfront and Duwamish waterways. They also figure in the building of Treasure Island in San Francisco Bay and Terminal Island at Los Angeles. Mr. Huff explained that Harbor Island is regarded as the largest man-made island insofar as area is concerned, but Treasure Island, being in deeper water, actually required more dredging.



COOPER-BESSEMER RECEIVES ARMY-NAVY "E"

Above: Gordon Lefebvre, president, receives the pennant from Rear Admiral Thomas B. Richey, USN. . . . Below: One of the firm's new cast Meehanite crankshafts being examined by Rear Admiral P. B. Eaton, USN; Rear Admiral T. B. Richey, U.S.N.; Stanley Johnson, Cooper-Bessemer sales manager; Col. M. A. McFadden, U. S. Army; Gordon Lefebvre, Cooper-Bessemer president, and Captain L. F. Small, USN.

Armies to Handle Wounded Seamen

American and British Army medical facilities will be available to all United Nations seamen who may be wounded in the forthcoming invasion of Europe, it was announced recently by War Shipping Administration officials. This disclosure follows recent discussions between W.S.A., British Ministry of War Transport and British and American Army officials.

An extensive machinery has been set up in the United Kingdom to handle casualties and to arrange for transportation from the continent to hospitals in Britain, and at Army casualty stations on the beachheads. The wounded will be registered and cleared through the British Ministry of War Transport and the Recruitment and Manning Organization of W.S.A.

(Left to right): H. W. McCurdy, president; Raymond J. Huff, vice president and secretary; Gino Fabbri, general foreman, and H. W. Blaney, manager, Ship Repair Division of Puget Sound Bridge & Dredge Company, Seattle, Washington.

WHO'S WHO afloat and ashore

Diesel Technician Laurence B. Hume, U.S.N.

Reduction in Seamen's Bonuses In Pacific Area

Reductions in bonuses paid merchant seamen sailing from Pacific Coast ports to certain Pacific areas and increases for men sailing into European waters of war, was announced by the Maritime War Emergency Board recently.

Varied reactions met the information in West Coast seaman's headquarters, but officials of these unions reiterated their pledge "to keep 'em sailing."

The reduction affects men sailing from Pacific ports to Hawaii, Central and South American ports and certain Alaskan waters. The new policy went into effect March 31, with reductions in the above areas ranging from 100 per cent to 25 per cent and 66 2/3 per cent. The latter figure is to become effective only after ships have covered approximately 40 per cent of the distance to their destinations.

The NMU of the Pacific Coast sent protest telegrams with the names of 300 signed, pointing out seamen will be unable to support themselves and families under the new bonus scale. They asked the reductions be withheld indefinitely.

Diesel Technician Assigned to Navy Service

Continuing its program of calling up qualified engine technicians to serve in distant bases, the U. S. Navy, Bureau of Ships, has assigned **Laurence B. Hume,** former service engineer at the Washington, D. C., office of The Cooper-Bessemer Corporation, as supervisor in the installation, maintenance and repair of the firm's diesel engines.

In his new post, Mr. Hume has been given the rank of technician, USN, and will represent the Bureau of Ships in foreign service. In this capacity he reports to the Commander of the Service Force in the area to which he is assigned.

F. E. Diggs Now Bar Pilot

Francis E. Diggs, recently Captain of the Liberty ship S. S. John Page, has been named a bar pilot in San Francisco and has taken his first assignment.

He sailed as an officer on the S. S. Matsonia, S. S. Yale, S. S. Harvard and other large vessels over the past several years.

The Sponsors' party at two recent launchings at The Permanente Metals Corporation, Richmond Shipyard No. 2, included (at left) the launching of the S. S. William J. Gray with Mrs. William J. Gray as sponsor, wife of Captain Gray standing on the left, with Miss Carol J. Gray, flower girl; Mrs. Carlton R. Gray, matron of honor, and C. R. Gray. The launching party of the S. S. Edward S. Hough in which Miss Elean Hough acted as sponsor includes E. S. Hough, Jr., Mrs. Hough, matron of honor; the sponsor; Miss Mary Hough, maid of honor; and the junior member of the family.

Dynamic Balancing

E. W. Fitzmaurice and Associates have recently purchased the East Bay plant and business of the Engineering Specialties Company and have changed the name of that concern to the Balance Engineering Company. Associated with Mr. Fitzmaurice in this enterprise are Vernon Lynn, formerly for five years in charge of the balance department at Mare Island Navy Yard, and Dr. L. H. Cook of the Cook Laboratories, Menlo Park.

Balance Engineering Company is equipped with modern Akimoff machines for both static and dynamic balancing of all types of machinery. They can handle rotors up to $7\frac{1}{2}$ tons weight in their shop. Heavier rotors are handled in place in the ship or power plant.

This new and energetic service organization should be in great demand with the tremendous increase in turbine drive and in high-speed diesels.

Eugene Hoffman, Propeller Club secretary, was more than a little surprised when he was presented with a birthday cake at the March luncheon meeting.

WSA Appointment

Walter W. Schwenk succeeded Captain Granville Conway as Atlantic Coast director of WSA. Mr. Conway was appointed deputy administrator upon resignation of Lewis W. Douglas. Mr. Schwenk, before the war, was manager of the Consolidated Navigation Company, and had been serving as Captain Conway's assistant until the new assignment.

Marinship Appointments

The appointment of **Richard F. Grambow** as naval architect and **Leonard G. Rummel, Jr.,** as Marine Engineer has been annnounced by Marinship Corporation, Sausalito, through the offices of Bruce Vernon, chief engineer of the tanker yard.

Mr. Grambow, 27-year-old Webb Institute graduate, has been assistant naval architect at Marinship since July, 1942. Previously, he spent two years with Gibbs and Cox, New York naval architects, and served for three years as an associate naval architect at the New York Navy Yard.

Mr. Rummel is a recent addition to the Marinship staff, coming to the West Coast yard after two years as marine engineer at Leatham D. Smith Shipbuilding Company of Sturgeon Bay, Wisconsin. He is a graduate of the Armour Institute of Technology in the Class of 1934, also studied under the Spellman Foundation at the University of Chicago.

Killed in Action

Raymond E. Murphy, who left the managership of the marine department of Cosgrove & Co., San Francisco insurance brokers, to enlist in the Navy as a lieutenant, was killed April 16 in the Pacific during combat. He was at sea only a month.

He asked for active sea duty while stationed at Point Hueneme. Forty years of age, Lieutenant Murphy is survived by his widow, a son, Lee, and his parents.

An attorney, graduate of Stanford, he was with Cosgrove for five years before joining the Navy.

(Above): Leonard G. Rummel, Jr., newly appointed marine engineer at Marinship.

(At right): Richard Grambow, recently appointed naval architect at the tanker yard.

Dr. Vernon E. Hendershot

Left to right: Ted R. Henry, James P. Dickinson, D. S. Macaulay, of Stow Manufacturing Company.

Expert Heard On Propaganda Warfare

Members of the Mariners' Club of California who missed the April meeting passed up the opportunity of hearing what had been termed "one of the most outstanding programs ever presented by the club."

Dr. Vernon E. Hendershot, head of the Malay Language Unit of the Overseas Branch of the Office of War Information, told of the 24-hour-a-day battle of wits waged every day between our Office of War Information broadcasters and the highly imaginative news accounts beamed to the South Pacific by short wave from Tokyo.

"Our goal," said Dr. Hendershot, "is to create and maintain permanent friendships for the United States and the allied cause throughout Asia. Information coming back to us indicates that we are achieving astonishing results by our broadcasts, even in Japan itself." He pointed out that the O.W.I., broadcasting from San Francisco, sends factual war news to all the Pacific area in 25 Asiatic dialects, in addition to major languages, covering every race and religion.

At the conclusion of his talk Dr. Hendershot was extended a unanimous invitation to return at an early date and explain other phases of the O.W.I.'s important part in the winning of the war in the Pacific.

New Representative of Stow Mfg. Co.

S. D. Macaulay, formerly chief marine engineer with the naval architects, Joslyn & Ryan, was named regional representative for the Stow Manufacturing Company in San Francisco by James P. Dickinson, vice-president of the company.

The organization, with main offices and plant in Binghampton, New York, maintains two Pacific Coast offices, the other is at 1113 William Fox Building in Los Angeles, managed by Ted R. Henry.

Mr. Dickinson pointed out that the company is in a position to offer service and consultation to all industrial plants on their problems of remote control of manifolds and valves.

"The Road To Murmansk"

An oil painting, "The Road to Murmansk," the work of Lieutenant Commander Anton Otto Fischer of the U. S. Coast Guard, was presented to Rear Admiral Emory S. Land (second from the left), head of the War Shipping Administration, in memory of 5000 merchant seamen killed or missing in the war, by Thomas A. Morgan (extreme right), president of The Sperry Corporation. Others inspecting the painting are Captain Giles C. Stedman (extreme left), superintendent of the U. S. Merchant Marine Academy at Kings Point, L. I., where the painting will be displayed in the academy library, and Captain Edward Macauley, a member of the U. S. Maritime Commission.

Hendy General Sales Manager

Wallace Johnson was recently appointed general sales manager of the Joshua Hendy Iron Works at Sunnyvale, California, according to an an-

Wallace Johnson, general sales manager of Joshua Hendy.

nouncement from Charles E. Moore president.

With an engineering as well as a sales background, he comes to the new post well qualified to direct the sales of this large manufacturer of prime movers. He is a graduate of California Institute of Technology in mechanical engineering.

Morris Levit is head of sales for the Joshua Hendy division, with C. L. Barrett as sales manager at Pomona division and L. T. Warner at Crocker-Wheeler division.

Ed Harms Returns to McCormick

Edward H. Harms has returned to the McCormick Steamship Company as operating manager, a promotion from his pre-war post as assistant operating manager. He assumed his new duties on May 1, following resignation as assistant Pacific Coast director for the War Shipping Administration in Los Angeles.

Stafford Harlow is Mr. Harms successor with WSA.

One of the younger executives of the steamship business, Mr. Harms is recognized as one of the outstanding marine men in operations in the country. He attained national recognition for his able directorship of the 1941 National Convention of the Propeller Club of the United States held in San Francisco.

Women's Port Of San Francisco Formed

Pacific Coast Women's Organization for the American Merchant Marine, Inc. held its first meeting at the Army Navy Club in San Francisco, on May 9, to nominate officers. The following Tuesday, May 16, these officers were elected.

The inspiration for an organization of this type gained its strength with a group of Peninsula women from the reports by Mrs. Oscar DuPont, chairman of the War Relief Committee of The Women's Organization for the American Merchant Marine, Inc., and further enthusiasm was added by Mrs. Arthur Tode, chairman of the "Adopt a Ship" Committee of the same organization, when both these women were on the Coast early this year.

It was realized that a group similar to the New York association could be active in San Francisco, and through correspondence with Mrs. Bertram C. Edwards, president of the New York organiaztion, affiliation was made with the Eastern group. Since then, the women have been working for the welfare of the merchant seamen, concentrating their activities to the interior decoration of the annex "Millport Haven," and serving as hostesses on February 12, when the first anniversary of Millbrae Rest Center was celebrated and the annex dedicated.

The local group is known as the Port of San Francisco chapter. It holds monthly meetings on the second Tuesday of each month, held at the Army Navy Club, 560 Sutter Street, San Francisco. Eligible for membership are women of whose family some male member is associated with activities of the American Merchant Marine, and with this qualification the Bay Area women are invited to become members.

Those women whose work resulted in establishing such an organization on the Pacific Coast were Mrs. Earle H. Carder, of Menlo Park, head of the local group; and Mrs. Harry Parsons and Mrs. J. A. McCowan, assistants in the organization, and members of the New York association now residing in San Francisco.

ELECTRICAL INSPECTORS

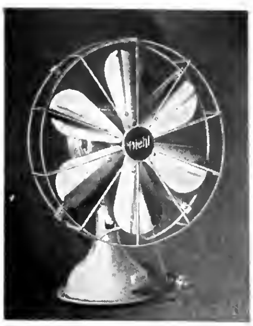
Seated, left to right: Edward F. Crookshanks; Frank B. Hale, senior inspector; Fred B. Jones, principal inspector; William A. Correia, principal machinery inspector; and Eugene H. Ross. Standing: Joseph Drowim, Aurie V. Kuntz, Walter E. Shelton, Andrew A. Farrell, Loren E. Wells, John Erickson and John J. Williamson.

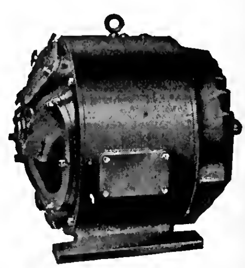
U. S. Maritime Commission Inspectors

Kaiser Company, Inc.
Richmond, California
Yard No. 3

HULL INSPECTORS

First row, left to right: F. M. Baldwin; B. E. Day, senior inspector; A. R. Brown, first senior inspector; William Anderson, principal inspector; Allan MacDonald, acting senior inspector; Jerry H. Cozzens, acting senior inspector, and Bradley D. Webb. Standing: J. W. Sheehan, H. E. Stillman, E. T. Nicholas, H. L. Davis, Norman MacLeod, Joseph DeMallo, J. F. Oliver, Alex Galloway, G. E. Moore, Paul H. Brown and Donald D. Hough.





Obituary

Henry William Dixon

At Highland Hospital, Oakland, California, on April 22, there passed away one of the most colorful men that has ever been connected with the marine business in this country. Henry William Dixon's genial personality and large fund of experience endeared him to everybody and it is with deep regret that his friends in San Francisco and other cities will note the passing of this "grand old man."

Born in London, England, in 1863, he served his apprenticeship in the locomotive works of the North London Railway Co. His education consisted of public school and Homerton College in London. After his graduation, for several years he was associated with Galbraith, Pembrake & Company, and finally obtained his Board of Trade's Chief Engineer certificate in 1888.

Later he came to America and was first assistant, then chief engineer, on the steamer San Mateo of the Pacific Improvement Company. This steamer was one of the first high-pressure steam jobs to come to the Pacific Coast. In 1894, he became a citizen of the United States and obtained his Chief Engineer's license and was transferred to the Pacific Mail Line as chief engineer of the S. S. Newport.

Later he became a consultant engineer and marine surveyor for various accounts in New York City and was frequently a visitor on the Pacific Coast. In 1939 Mr. Dixon moved to San Francisco where he became associated as Inspector with the firm of Hough & Egbert Company. In January, 1944, he was acting as Inspector for the Walter Kidde Company on the Lux fire extinguishing and Rich-audio Smoke detecting systems.

A New Ramped Fireboat

Up in Vancouver, B. C., invasion boat designer E. F. Cribb has already put some of his post-war plans into work.

Vancouver had a fire hazard problem. For the new vast harbor improvements, made necessary by the war, fire protection was inadequate. The underwriters had recommended the purchase of two regulation fireboats, an outlay of half a million dollars, which boats called for a trained crew of firemen and full apparatus.

Here Mr. Cribb steps in with his plan—a fleet of Gray diesel-powered landing craft equipped with pumping apparatus. He did not have to sell the city fathers on efficiency, maneuverability, speed and beaching qualities of Gray-equipped landing craft—the war had already done that. It was easy to explain the money-saving in the Cribb plan and the larger scope of a fleet of landing barges moored at strategic points in the harbor. No crew of trained firemen would be necessary, as they would be ready at a moment's notice to tie up with the land forces and their apparatus.

An invasion boat converted into a Harbor Fire Fighter. The 8-foot landing aprons can be dropped or raised and deluge guns, monitors or hose nozzles can be played through them.

Plans call for two 125-hp Gray motors driving twin screws and controlled from a wheelhouse situated amidship, giving the helmsman clear vision.

There will be three Bickle-Seagrave ARP pumpers delivering 1200-gallons a minute through six individual hose lines on each boat.

Regardless of tidal changes, this type fireboat can be brought close inshore because of its shallow draft, and the ramp will act as a fire screen.

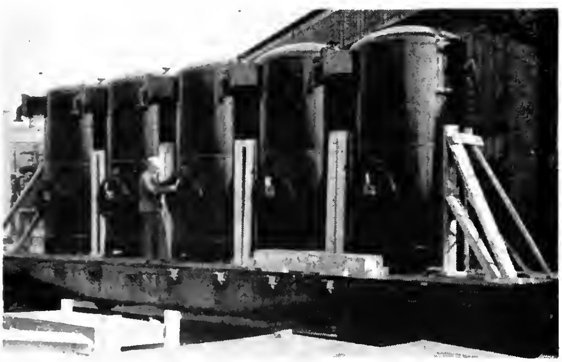
Mr. Cribb feels he has a solution to many a shore town's fire problems where the city budget is limited. The cost will be about one-fifth that of a regular fireboat and the upkeep and maintenance will be proportionally low.

Pure Feedwater For Victory Boilers

The address tags on these five deaerating heaters being shipped from Elliott Company, Jeannette, Pa., read, "U. S. Maritime Commission, Los Angeles." Destined for the new Victory ships building at Calship, nearly 200 of these heaters are leaving the Elliott plant at the rate of a carload a week.

Each heater weighs 4800 pounds and stands more than 11 feet high. Five and one-half feet in diameter, each deaerating heater will handle a normal delivery capacity of 70,000 pounds of water per hour through the ship's boilers, heating the water and removing dissolved corrosive gases, which otherwise would pit the boiler tubes.

The shipping of large equipment over long rail hauls requires close study of loading, bracing, routing, distance, weight and methods of handling to speed the war effort, and the company's shipping crew is getting lots of practice these days.



Deaerating heaters for the Maritime Commission.

Stockton Yards To Build More Ships

Contracts recently awarded insure another year of activity in at least four of the ten shipyards at Stockton, California.

The Pollock-Stockton yards will build 46 craft of different types, including floating drydocks, steel and wooden cargo barges and troop barges.

Stephen Bros. Boat Works has a contract to build 33 rescue-type ships.

The Moore Equipment Co. has a continuing contract with the Navy to build invasion barges.

The Clyde W. Wood Co. is 75 per cent along on its Government contract, and has started building six small fishing boats.

Since Stockton's shipbuilding industry was revived with the start of the war, Stockton yards have received contracts for $106,418,140 worth of ships, of which vessels representing $45,172,026 have been delivered.

Air-Conditioned Mercury Searchlight

A new high-intensity searchlight, the smallest size of which provides four times the candlepower of an incandescent unit the same size, has been announced by the General Electric Lighting Division. This searchlight, available in 12-, 18-, and 24-inch idameters, comes in a wide variety of mountings suitable for shipboard or land use. Light source is a midget capillary-type 900-watt mercury lamp, which throws a flat, concentrated beam capable of illuminating distant horizontal surfaces from a low mounting height.

The lamp is air-cooled for operation in all types of weather. Cooling is necessary because the heat in this high-intensity mercury arc lamp has a tendency to create a high internal pressure, which must be kept down, as otherwise it would extinguish the arc. When the searchlight is on, air is forced constantly through a rubber hose into the top of the searchlight drum by an air compressor. The air blows over the twin nozzles. The air compressor, which is an optional part of the searchlight, provides oil- and moisture-free air at 25 pounds per square inch pressure at a rate of six cubic feet per minute. It is driven by a ¾-hp motor.

Air-conditioned mercury searchlight.

Measured maximum candlepower values range from 7,500,000 for the 12-inch unit to 32,000,000 for the 24-inch searchlight. Three circular louvers are provided to prevent the escape of stray light.

Rivnuts Available

The patented Rivnut of the B. F. Goodrich Company, originally developed by its engineers for aeronautical uses, is now available for a wide variety of industrial applications, it is announced by E. F. Tomlinson, general manager of the company's Industrial Products Sales division. The minimum priority requirement for industrial usage is AA-5.

The Rivnut is an internally-threaded and counterbored tubular rivet which can be headed blind, made from one of the most corrosive-resistant practical aluminum alloys. Of one-piece construction, it is anodized and ready for use when received.

By the use of special tools, either manually or power operated, which the company also distributes, it can be pulled up or headed while working entirely from one side, forming a bulge or head on the far side. This upset is large enough to resist being pulled through the metal, plastics or hard rubber to which it is applied.

Typical examples of applications include tubular sections, stove pipes, cabinets, expansion nuts for wood floors, such as for carpet attachments, use with plastics and hard rubber.

A 12 page manual giving all details is available on request.

New Coated Electrode

The Wilson Welder and Metals Co. announces a new coated aluminum-bronze electrode, Wilson No 200. This high tensile bronze shielded arc electrode can be used as a filter rod in carbon arc welding. It will produce welding deposits equal to manganese bronze in strength and hot ductility, and superior to it in resistance to corrosion.

Wilson No. 200 has a most universal application in the welding of most bronzes, malleable and cast iron or steel.

This rod can also be used for welding dissimilar metals, such as cast iron to brass, steel to malleable iron, or the joining of any two metals which are weldable with aluminum-bronze.

An Incident on L.S.T. at Sea

George Chitarovich, with the 84th Naval Construction Battalion somewhere in New Guinea, writes about an experience with welding repair while on the high seas:

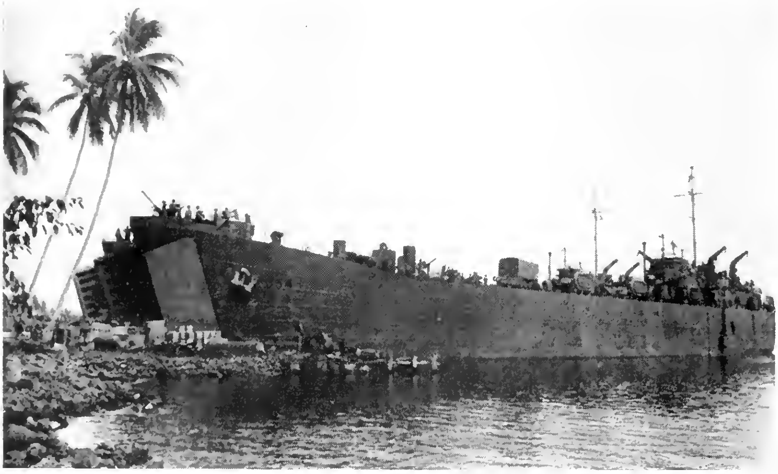
"We thought you would be interested in some of the most extraordinary welding jobs completed while at sea. I have been in the 'Seabees' 9 months overseas, and our outfit has been doing an excellent job with the help of the two 300-amp. Hobart gasoline-engine-driven arc welders that are part of the equipment of our platoon.

"On one occasion when 10 miles from shore, an 'Incident happened'—well, anyway, a hole was blown in the side of our Navy LST (Landing Ship-Tank) just two feet above the waterline. The C. O. called me on the job to determine whether the repair could be made en route or should we put in for shore. I asked permission to attempt the repair at once.

"Since the hole was very rough and jagged, I first burnt out the hole to a five-foot square opening. I had counted on using some armor plate for the patch, but found it was in the hold of the ship and impossible to get it. We carry pontoons on deck that are 1/4" inch thick, so we cut up one of these pontoons to fit the square opening that I had cut out and then did a leak-proof job of welding with one of the Hobart welders that we carry on top deck.

"After completing this much of the job I suggested to the officer in charge that we weld another pontoon plate on the inside to reinforce the first plate, as the patch would be from 2 to 4 feet below the waterline when the deck load would be twice that which we were carrying. This second plate was welded under very tough conditions, as the ship was heaving around from the swells of the sea.

"Later on, I was asked why I had put the second plate on the inside rather than the outside overlapping the first plate. As there was not much pressure on the plate itself, I was anxious to do a neat job on the patch, and if the plate had been lapped on the outside it would have appeared as really a patch job. These boys of



Side by side, two of the Navy's new landing ships-tanks (LST) unload their cargoes of the materials of war on Rendova Island in the central Solomons.

(Photo courtesy Hobart Brothers Co., Troy, O.)

the LST's are mighty proud of their ships, and we 'Seabees,' too, are always proud of our work. She's still going strong, delivering men, tanks, guns and supplies, and from outward appearances one can hardly observe that we were ever the victims of 'an incident.' "

(Courtesy of "Hobart Arc Welding News")

Low-Cost Electric Chain Hoist

Designed for users preferring chain hoisting, the small "Handi-Lift" developed by Harnischfeger Corporation introduces many new features into the low-price electric chain hoist field. Increased utility is claimed by quick interchangeability to bolt, hook, or trolley mounting, with changeover requiring the loosening of one bolt only. In trolley service, it can be suspended either parallel or crosswise to beam for greater flexibility.

Fully enclosed construction permits use under any condition of weather, dust, moisture, or acid fumes. While the unit is rated at 500 pounds, a genuine hoist motor supplies unusually high reserve capacity. The chain is proof-tested for 1800 pounds.

Operation is by handy pull cord actuating a simple lever toggle arrangement, which leaves one hand free to guide the load. The chain wheel, which is forged of high carbon steel and heat-treated, is splined to the drive gear. Over-travel of hook at both upper and lower limits is prevented by a zinc die cast safety limit stop which also actuates control for raising and lowering loads. Dual braking is provided by a large spring-set electric motor brake which automatically releases when hoist is operated and sets instantly with shut-off current. Lowering control is by dynamic means supplemented by the spring set brake which holds the load, should current fail. All brake parts are die cast.

By removing hook, yoke can be used as a clevis. The unit operates on 3 phase 60 cycle, 220 or 440 volts, and is shipped complete, ready to install as specified. "Handi-Lift" bulletin No. H-23, giving specifications, is available on request from the Hoist Division, Harnischfeger Corporation, Milwaukee 14, Wisconsin.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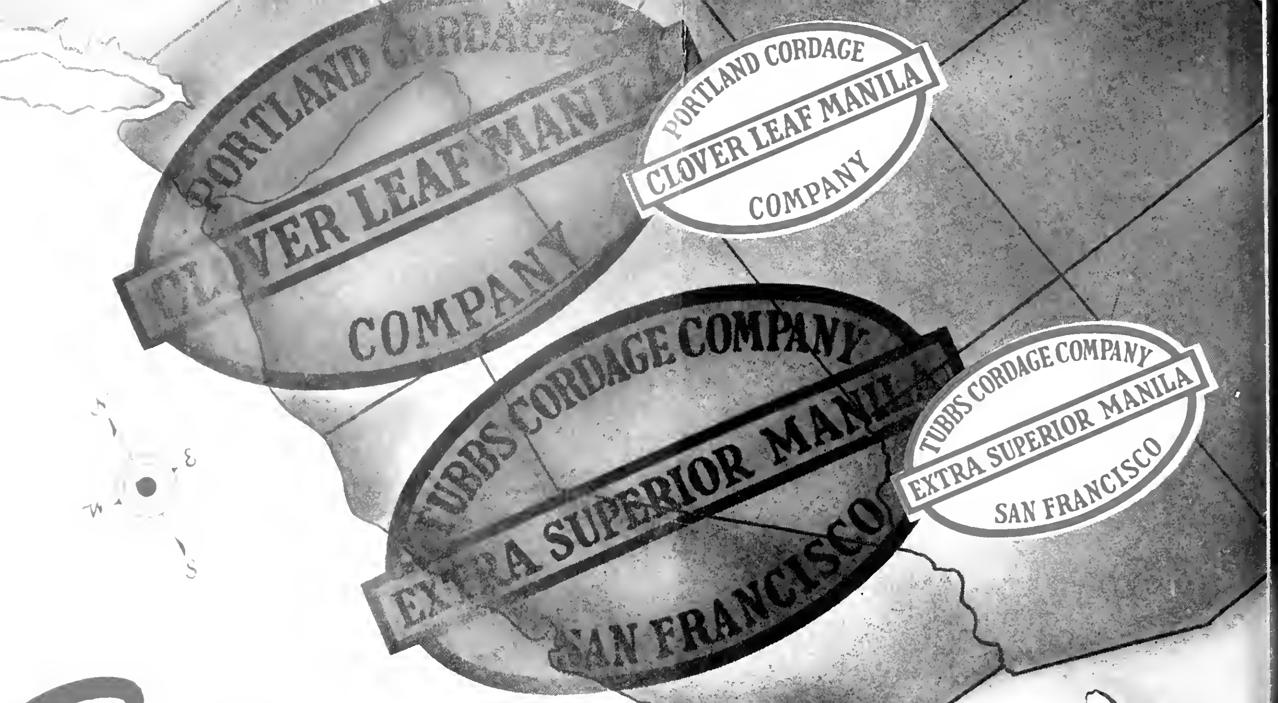

Reflections

OF POST WAR "BUY WORDS"

Coming events cast their shadows ahead . . . when "V" day comes, the West will once again be able to depend on the famous Tubbs and Portland trademarks that for generations have stood for Marine rope dependability.

Until that time, do everything you possibly can to make your rope last longer. Vast quantities of rope today are going to our armed forces on land and sea to help bring the day of Victory closer for America and our Allies.

While the trademarks above are at present unavailable, you will still find a Tubbs and Portland rope to serve your Marine needs. When you must replace rope, it will pay you now, as in peacetime, to specify "Tubbs" or "Portland" to your supplier.

nd for booklets, "The pe You Save Fights For u" and "14 Ways to ke Rope Last Longer" d for illustrated Rope nservation Chart.

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TUBBS CORDAGE COMPANY
200 BUSH ST., SAN FRANCISCO, CALIF.

PORTLAND CORDAGE COMPANY
PORTLAND • SEATTLE

Pacific Marine Review

Our Cover

The gold-wreathed Maritime Merit Eagle pennant is proudly flown at Richmond, California. Presented on National Maritime Day, May 22, by U. S. Maritime Commission Regional Director Carl W. Flesher, to Permanente Yards One and Two, it is the symbol of 22 consecutive awards for outstanding achivement in the Victory Fleet program.

Currently the Gold Wreath was awarded to Calship (as chronicled on the first page of Running Lights section). First award of the Eagle was made last year to Oregonship. Bethlehem-Fairfield of Baltimore, Maryland, was the second yard in the nation to receive the golden-wreathed recognition.

Member Audit Bureau of Circulations

Official Organ

Pacific American Steamship Association

Shipowners Association of the Pacific Coast

Contents - - - - - - - June, 1944

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Pacific MARINE REVIEW

Shipyard Labor

The United States Department of Labor has recently issued some very interesting figures on employment in the shipbuilding and ship repair plants (including Navy yards) of America. The tabular arrangement of these figures shows monthly employment from January, 1935, to January, 1944. During these nine years there was a monthly average increase of 15,500 workers.

In January, 1935, the total employment in American shipyards was 62,900. By the end of 1943 this 1935 figure had been multiplied by 27, and the employment in all yards stood at 1,694,800 workers. Of these totals in 1935 there were approximately 19,000 in Navy yards and 44,000 in private yards, and in 1943 there were 326,000 in Navy yards and 1,396,000 in private yards.

The geographical distribution is interesting. In December of 1943: the Atlantic Coast yards had 783,800 workers, or 46 per cent of the total; the Pacific Coast shipyards had 580,700, or 33 per cent; the Gulf Coast yards had 238,800, or 14 per cent; and the Great Lakes and inland yards had 119,200, or 7 per cent.

Up to March, 1942, less than one-half of one per cent of shipyard personnel were women. By January, 1944, over 10 per cent were women.

As indicative of the growing importance of welding in the shipbuilding technique, it is noted that only four per cent of the workers were welders in 1936, and by June, 1943, this trade had multiplied to nine per cent, or from 3880 to 151,992 in seven years. This meant the production of 60 skilled welders a day for every day of that period. These welders have to be certified under rigid tests by the American Bureau of Shipping and/or more rigid tests by the U. S. Navy. This requires a course of from five to ten weeks, and there are many failures.

The training problem was enormous and is still in process at a tremendous rate. That these hastily-trained workers in all the shipyard trades have produced ships at a rate never before approached by the industry is now a matter of history and an inspiring tribute to the American genius for systematic production.

In the tabular figures there is a steady increase from January, 1940, to July, 1943, then a sudden recession of 5000 workers in August of the latter year, a slight increase in September, followed by a recession in October, and a jump to an all-time high in November, followed by a gradual recession.

These recessions have been "viewed with alarm" by some politicians and by the Manpower Commission, but considered as percentages of the total they seem unimportant. The largest monthly recession is less than three-tenths of one per cent. In several Pacific Coast shipyards it has been observed that recessions on a much larger ratio have been accompanied by increases in production even though viewed as "critical shortages in man power" by some officials in Washington.

Total Employment in United States Shipyards on Construction
and Repair of Naval and Cargo Vessels
January 1935-January 1944
(In Thousands)

Month	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944
January.......	62.9	79.9	95.3	97.9	101.6	137.2	255.5	588.7	1,477.7	1,684.9
February......	66.2	80.2	98.0	94.4	105.7	141.6	270.3	660.1	1,530.0	
March.........	66.7	87.1	104.2	93.7	108.8	148.7	288.9	726.4	1,587.7	
April.........	67.0	95.3	105.0	91.4	113.7	151.7	304.3	803.3	1,627.8	
May...........	67.2	97.9	106.7	93.8	117.3	158.5	317.1	882.9	1,659.9	
June..........	62.6	88.6	102.8	94.3	121.4	168.0	342.1	949.6	1,688.6	
July..........	68.4	96.0	98.7	93.6	119.6	177.3	380.0	1,038.6	1,721.5	
August........	67.3	97.2	99.8	91.5	120.1	190.3	410.1	1,143.8	1,716.5	
September.....	69.3	99.4	103.3	91.4	127.6	201.5	425.5	1,224.3	1,717.7	
October.......	72.9	99.2	103.4	93.8	131.8	215.5	468.7	1,277.1	1,714.6	
November......	74.8	96.7	102.3	98.1	132.7	230.4	505.8	1,346.9	1,723.3	
December......	76.2	91.8	101.5	100.8	138.5	242.3	556.1	1,406.4	1,722.5	

Since the dark days of early 1942 there have been ups and downs, but the trend shows how we have whipped the submarine menace to a minimum. Note that the three high and low points in each year follow a seasonal pattern but the downward trend is constant. Losses of merchant marine personnel naturally follow the same trend.
(U. S. Maritime Commission photo.)

The AMERICAN MERCHANT MARINE *and the* WAR

TODAY the United States is in possession of the largest merchant fleet ever assembled under one flag and is conducting a complex shipping operation that is successfully translating the enormous industrial power of America into fighting strength all over the world.

The huge American Merchant Marine that is serving the war purposes of the United Nations so well has largely been built since Pearl Harbor. The emergency construction program, inaugurated even before we were drawn into the war, placed almost 1800 Liberty ships into war service in 1942 and 1943. These dependable vessels carried a great share of the destiny of the anti-Axis world in their holds in our first months in the war. Much of the material that helped to establish our troops in strategic positions all over the world, to halt Japan in the South Pacific, to chase Rommel from North Africa and to aid Russia in beating back the Axis horde, was carried in these emergency-inspired ships.

Eight million deadweight tons of new shipping had been delivered in 1942; the goal for 1943 was 16,000,000 tons. In late March, 1943, there were close to 80 shipyards under contract with the Maritime Commission, and a daily average of more than five ship deliveries had been passed. Liberty ships were being delivered in some yards in as little as 20 days after laying of the keel.

These rapid construction methods enabled the goal for 1943 to be substantially exceeded by delivery of 19,238,626 deadweight tons in the year, almost 17 times the tonnage of 1941. In 1942 and 1943, 2642 new ships were put into service, adding a total of 27,328,358 deadweight tons to the shipping and fighting capacity of the United Nations.

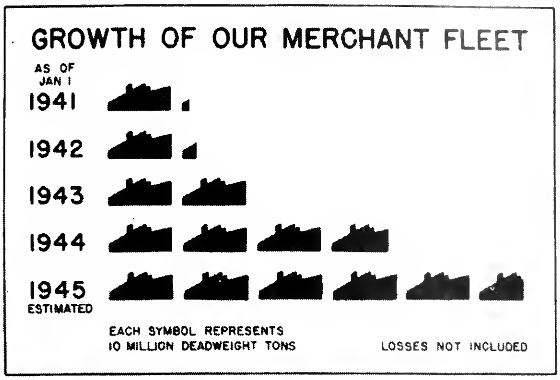
The War Shipping Administration

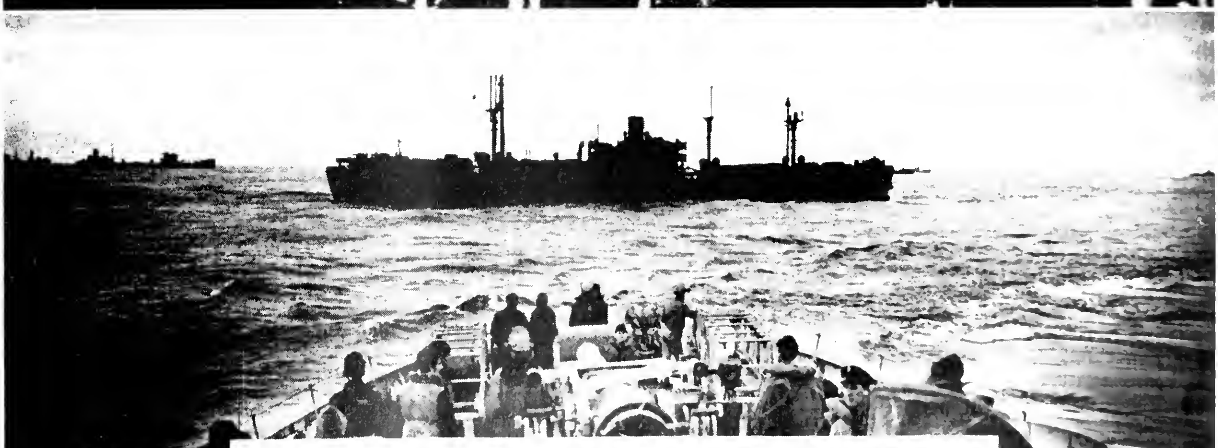
Operation of such a huge fleet, augmented by whatever additions were available from fleets of other United Nations, but minus a considerable number of vessels sunk by enemy action, called for an organization that could effectually cover the world-wide activities entailed by our entrance into the war and our expressed obligations to our allies. The principle of lend-lease was established in March, 1941. Immediately it

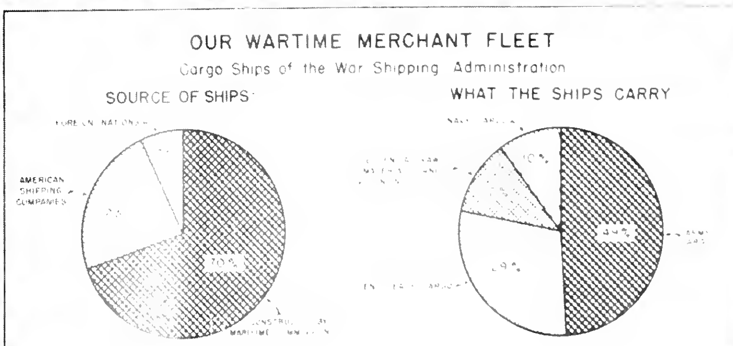
ON THE FACING PAGE:

Upper illustration depicts a night scene in a shipyard, where work of building the merchant fleet goes on through the dark hours on a round-the-clock schedule. The graph shows the phenomenal growth of the WSA cargo fleet from 1941.

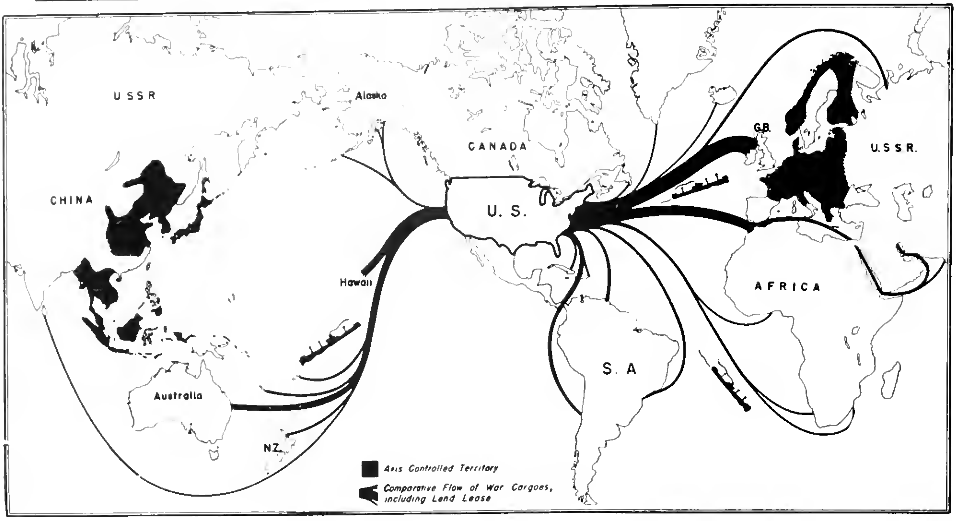
Lower photo shows Liberty ships and tanker in convoy under the protective guns of an escort vessel. The first pie-chart shows how the merchant fleet of the WSA is composed and how big a slice of total tonnage is made up of Maritime Commission ships. The second chart shows how heavily our ships are batting for the armed services and for our allies.
(U. S. Maritime Commission photos.)


GROWTH OF OUR MERCHANT FLEET
AS OF JAN 1
1941
1942
1943
1944
1945
ESTIMATED
EACH SYMBOL REPRESENTS
10 MILLION DEADWEIGHT TONS
LOSSES NOT INCLUDED




OUR WARTIME MERCHANT FLEET
Cargo Ships of the War Shipping Administration
SOURCE OF SHIPS
AMERICAN SHIPPING COMPANIES
70%
WHAT THE SHIPS CARRY
10%
44%

OUR MERCHANT SHIPS DELIVER THE GOODS



Width of flow lines on this new WSA world map indicates relative density of outbound traffic in the various services, but the lines do not represent actual ship routes. Outstanding difference from last year's shipping map is reopening of the Mediterranean route. An interesting example of the use of this route is that ships home-bound from Australia deliver Australian wheat and Indian and South African coal to Italy, then return across the Atlantic in ballast. This saves weeks of ship time.

(U. S. Maritime Commission photo.)

claimed a large part of our tonnage. Addition of military shipping in 1942 and maintenance of the imports and exports for civilian and manufacturing needs imposed a three-sided shipping problem that called for intricate planning.

In February, 1942, the War Shipping Administration was established by executive order of the President to operate the American Merchant Marine for the duration of the war. It was given broad powers to requisition and charter vessels for war purposes and to operate all ocean-going vessels under the United States flag, except those under direct control of the armed services. Later in the year the seamen training and recruitment activities were transferred to the War Shipping Administration and a comprehensive program set up to provide officers and men for the constantly expanding fleet.

Organization of the War Shipping Administration was effected, with many of the top officials of the Maritime Commission serving in a dual capacity with WSA. Rear Admiral E. S. Land, the Commission's chairman, was made War Shipping Administrator. With other officials of the Commission serving under him in the new agency, and many shipping executives drafted from private industry, the organization that has so effectively handled this hugest of cargo movements was set in motion.

Admiral Land was made the United States member of the Combined Shipping Adjustment Board, a coalition of the Maritime Commission's powers over United States shipping with those of the British Ministry of War Transport. The Board, by agreement of the United Nations, has supreme power over all vessels in the United Nation's shipping pool. The strategy required in the movement of cargoes on a world-wide basis is determined by the Board, operating from Washington and London, in conjunction with the needs expressed by the joint high military command, the requirements of lend-lease, and the other factors that keep shipping dynamic for the purposes of war.

Submarine Sinkings

In 1942 Axis raiders took a high toll in ships and men. War came close to our shores as ships were blown apart and seamen met death within sight of land. But in the fall of the year, as methods of detecting submarines were developed and the Navy devised more effective protection methods for the great convoys, sinkings dropped month by month. In 1943 they fell rapidly, and in 1944 the rate of sinkings was at its lowest level.

The cost of the battle against the efforts of enemy raiders to disrupt the oceanic supply lines cannot now be revealed in terms of ships and goods lost. But more than 5000 American seamen, of the 125,000 who sail our ships, are listed as dead, missing or prisoners of war.

The battle of transportation is being won. Huge stockpiles of the goods of war are being built up in all parts of the world for the invasions that will bring victory. Almost half the shipping leaving our ports is for the Army. The Navy requires another 10 per cent. Nearly 30 per cent is for lend-lease cargoes and the rest for handling essential raw materials and civilian necessities.

U-Boat Failure

The record made by ships under control of the War Shipping Administration in 1943 shows to what extent the Nazi U-boat menace failed. During that year nearly 47,000,000 tons of cargo, the equivalent of 6000 Liberty shiploads, moved from United States ports to the various war fronts or other parts of the world. American flag ships carried nearly 37,000,000 long tons of cargo, of which more than 95 per cent was carried in merchant vessels under WSA control. The remainder, approximately 10,000,000 tons, was carried in foreign flag vessels under coordinated schedules worked out by WSA through the Combined Shipping Adjustment Board.

Serving as the nation's overseas transportation agency, with all American ships requisitioned and under its operating control, the War Shipping Administration set up offices and placed representatives throughout the world. Careful scheduling and direction of ship movements utilized the rapidly growing merchant marine so that no essential military material destined for far-flung battle fronts was delayed.

Great Tramp Fleet

By the end of 1943 the American Merchant Marine was more than

twice as large as at the beginning of the war, despite the heavy losses in 1942. Of the present merchant fleet, about 70 per cent of the vessels have been derived from new construction, about 23 per cent were requisitioned from shipping companies, and the other seven per cent were acquired from foreign nations. The War Shipping Administration is operating what can be termed the greatest "tramp shipping" project in world history, since vessels do not operate on regular scheduled routes but are diverted from day to day to the operations requiring tonnage immediately. Under that method one ship can transport as high as half a dozen different cargoes in the course of one trip, thus utilizing the tonnage to the maximum.

It is this method of utilization that has transported on time and in ample volume the supplies and munitions required not only by our own fighting forces but by those of the other United Nations, and at the same time providing the American public with a more adequate supply of civilian commodities than has been available to any other nation.

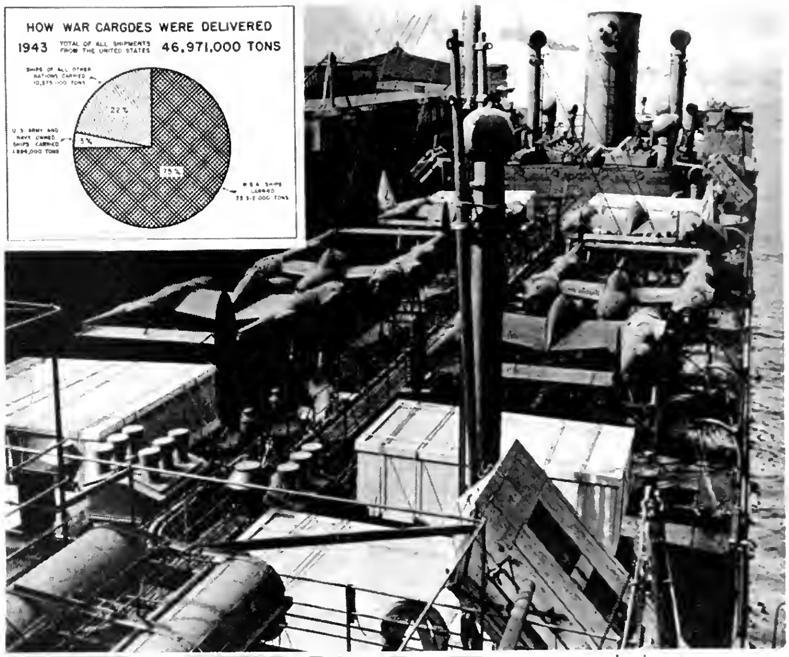
Suez Reopened

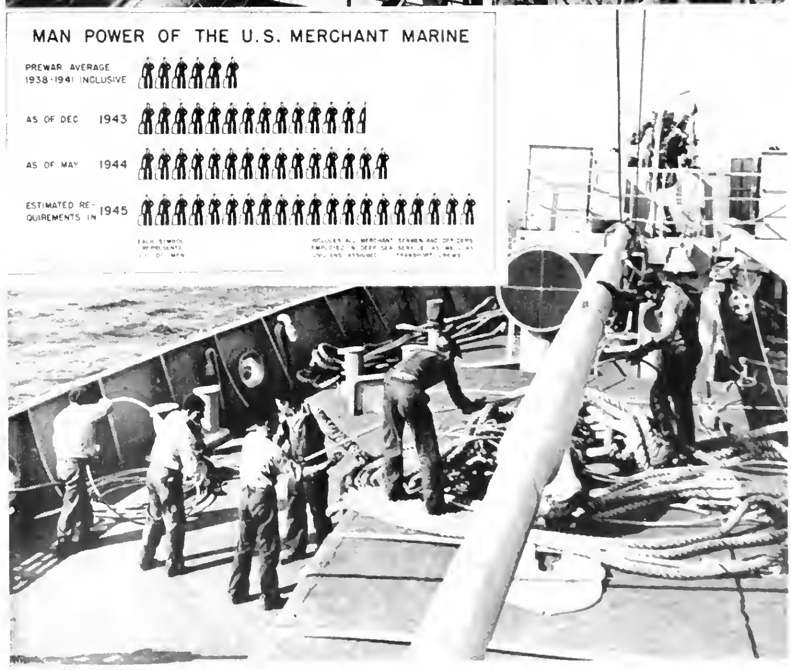
Reopening of the shipping route through the Mediterranean was one of the outstanding accomplishments of the Allies. This reopening resulted in conservation of merchant ship tonnage equal to more than 200 ships and permitted routing of essential materials to the United States with a saving of fully 50 per cent of the previous transport time. One example of the use of this route is shown by ships inbound from Australia delivering Australian wheat and Indian and South African coal to Italy, then carrying whatever load may be available back to the United States. Another utilization of inbound vessels returning from South Africa is to have them load coal for Brazil and then bring manganese and coffee from South American ports to the United States. Ships returning across the Pacific from Australia are so routed as to bring nitrates, tin and copper from the West Coast of South America through the Panama Canal to Gulf and East Coast ports.

Expansion of the tanker fleet under WSA control likewise has been almost phenomenal. Despite heavy losses through sinkings in 1942, the tanker fleet under the American flag has virtually doubled, with the result that adequate gasoline and other petroleum products now are available to all of our fighting forces. This has been accomplished by utilization of excess bunker space in merchant vessels as well as through careful routing of tanker tonnage.

One of the outstanding accomplishments of WSA was making available to the United Nations the bulk of the great armada of merchant vessels which carried men and supplies for the successful invasion of North Africa. This operation has

(Page 108, please)



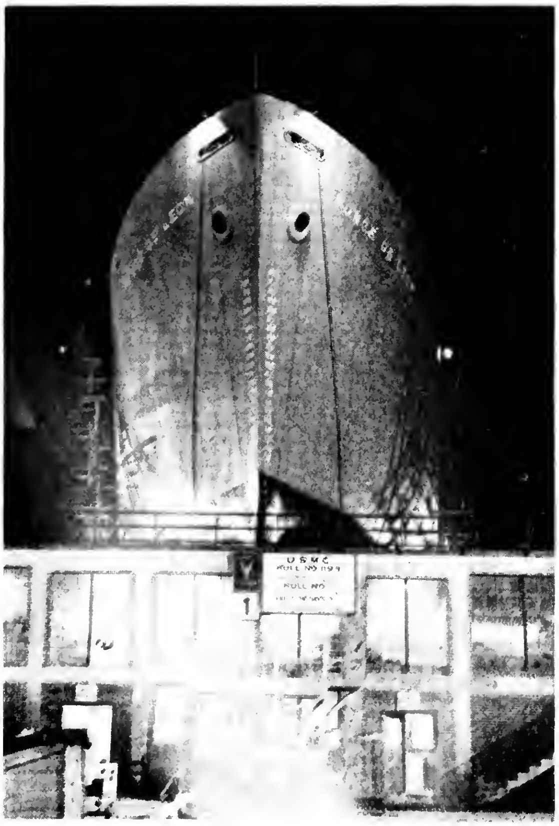


Upper: Our own merchant ships carried 75 per cent of war cargoes in 1943. Here is graphic proof of the huge share of vital war goods our own merchant fleet is bearing to our fighting men and our allies. Photo shows that wartime tankers carry a lot more than oil.

Lower: Through the efforts of the WSA in training and recruiting men and in securing their standards, our merchant marine personnel has grown from 60,000 at Pearl Harbor to 150,000 on Maritime Day, May 22, 1944. Fifty thousand more will be needed in 1945, and we shall have them.

(New York Daily News photo)

Night scene of the ways.



First St. Johns Liberty ship the night before launching—211 days after her keel was laid.

A BUSY LIBERTY YARD in Florida

AMONG the last of the emergency shipyards to be constructed under U. S. Maritime Commission contracts is the Jacksonville, Florida, plant of the St. Johns River Shipbuilding Company.

The site selected for this shipyard spreads along the waterfront on the St. Johns River at Jacksonville for nearly a mile, and extends inshore from 1000 to 1500 feet. Convenient-

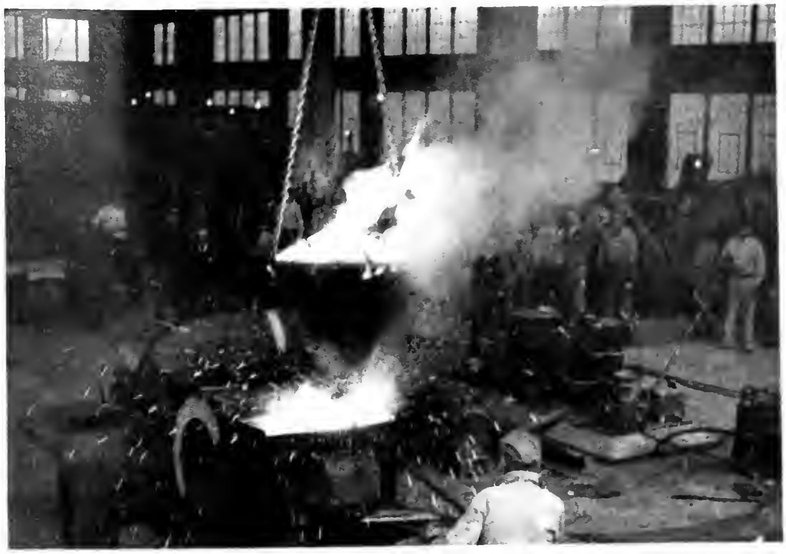
ly located only a few blocks from the heart of the city, the yard is on the main line of two large railroads, each having access to opposite ends of the plant. The yard is laid out to provide a straight line flow of incoming materials through fabrication processes to the ways. The general plan provides for rail delivery to the plate and structural-shape storage area at one end of the yard. Delivery to any of the eight wide bays of the fabrication shop is made by tracks extending into each bay, from which overhead cranes handle the material through the shop and to fabricated storage. From the storage area, tractor-drawn flat-bed trailer trucks and Hysters haul the fabricated steel to the assembly platens, serviced largely by crawler cranes instead of the usual gantries—this as a result of a general curtailment by the Maritime Commission on facility expenditures.

At the other end of the yard facilities are provided for outfitting the hulls. Boilers, machinery and fittings for the vessels move by rail to the warehouses and the shops or direct to the outfitting docks or the ways. Two gantries service the outfitting basin. All utilities are underground, or just above it in protected locations. Throughout the yard outlets are provided frequently to service all areas. On the ways, vertical risers with outlets at three levels carry the utilities to points of easy access to the vessels.

A 100 x 300 ft. mold loft is located adjacent to the fabrication building, but to one side, out of the line of flow of materials through the yard. This location makes it convenient to store templates not in use in the mold loft where they can be kept in constant repair.

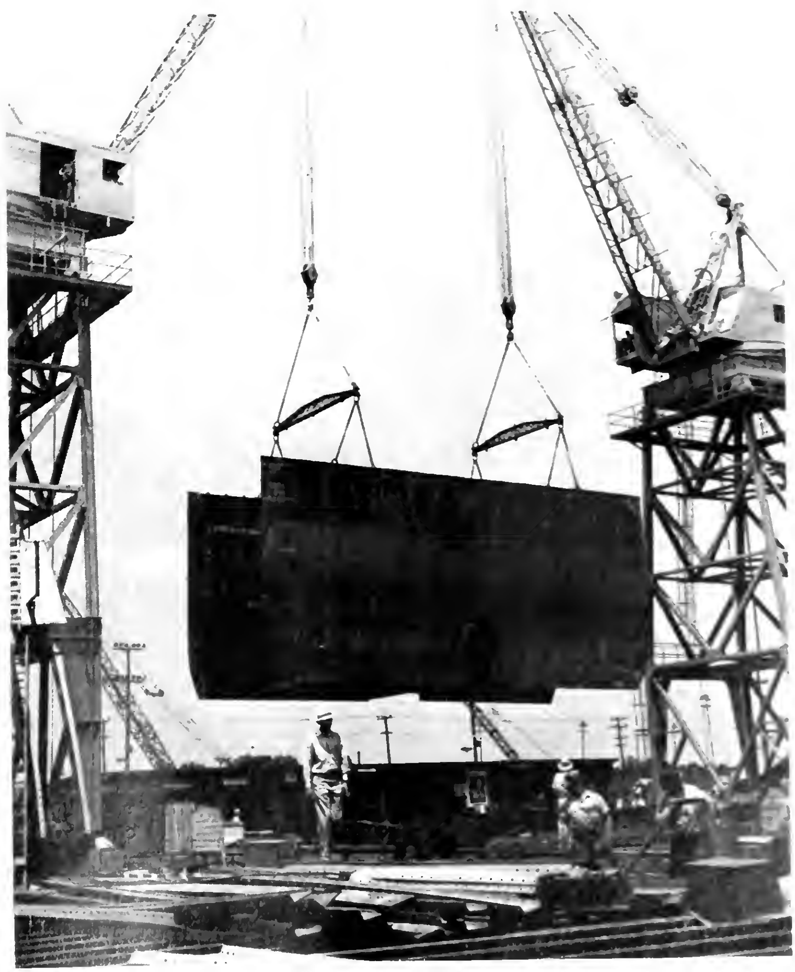
Fabrication is carried out under a sawtooth-roofed shed that is open at both ends to a height of 36 ft. to permit passage of overhead cranes with loads. There are eight 73-ft. wide bays in the building, each with a 10-ton-capacity overhead crane spanning 70 ft. The building is supported on a concrete frame that also carries the crane rail. These frames extend 60 ft. on the receiving side of the structure to permit unloading materials from cars, and on the opposite side are built out over the fabricated storage area.

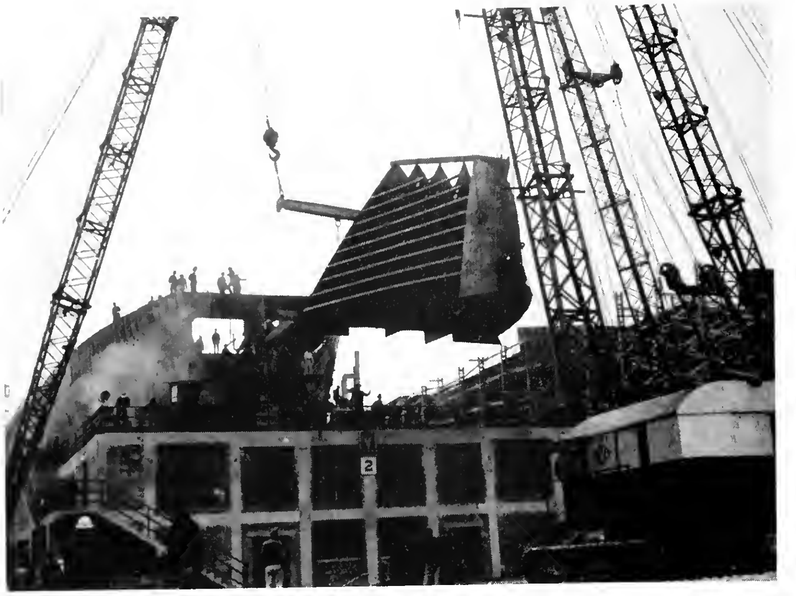
Each bay of the building is



Stern frame being thermit welded.

Two gantries in tandem carry 61-ton deep tank section from platen to ship way.





Four crawler cranes carrying a bow section to the ways.

equipped to do certain parts of the fabrication for each of the ships. The overhead cranes, supplemented by auxiliary hoisting devices at individual machines, handle the steel from cars into the shop and during the processing. At one end of the "fab" shop oil-burning furnaces serve steel "slab" 60 x 100 ft., providing ample space for hot bending.

After cutting, punching and bending as required the steel is moved to the fabricated storage areas to await use. Racks or a paved area for storage is provided on either side of two 20 ft. wide roadways under the center of the crane span. A transfer section 60 ft. wide adjacent to the fabricating shop is left open for passage of trucks and transfer of material.

Platens, or platforms, for preassembly of ship parts are at right angles to the line of flow of the material to the fabrication shop and storage space, but are in line with the ways so that the shipway cranes can be used to pick up assemblies and carry them to the ships.

Ways and platens are both 90 ft. wide and 120 ft. center to center with a 30 ft. space between adjacent units for operation of a 20-ft. rail-gage revolving crane on a high gantry. Cranes have a lifting capacity of 50 tons at about a 30-ft. radius, and travel nearly 1200 ft. to service platens and shipways on either side of the track. Heavy assemblies are handled by two cranes picking up the load and traveling with it.

The 90-ft.-wide section of the ways, used for construction, is 465 ft. long. The outboard ways are an additional 207 ft. long. Declivity throughout is $\frac{5}{8}$ in. per ft. The headhouses are 60 ft. in length, constructed on concrete frame and brick walls; these accommodate toolrooms, transformers, offices and workers' lockers.

Ship-fittings, machines and parts move in from the end of the yard opposite that from which the ship steel is delivered. Warehouses already existed on trackage along the waterfront, and were taken over by the Maritime Commission to provide storage space.

At the head of the outfitting dock are a semi-connected machine shop and a pipe and copper shop, each built on a concrete frame and each 150 x 200 ft. Crane rails, which are continuous over the 60-ft. opening between the buildings, extend over trackage built at either end of the structure. A central opening with 48-ft. clear height accommodates 78-ft. span bridge cranes of 25-ton capacity in the machine shop and 10 tons in the pipe and copper shop. Several smaller shops—joiner, sheet metal, electrical and others—are located nearby. All material delivery in this area is by rail, the cars passing under the overhead cranes at the principal shops for easy transfer of parts to the outfitting docks.

The St. Johns plant has a large employee training school, with separate classes for the training of welders, riveters, machine operators, ship fitters, pipe fitters, machinists and electricians. All employees are given a certain amount of instruction regarding the characteristics of hull form, and learn certain fundamental facts pertaining to the design of construction of the Liberty ship. Aptitude tests indicate for what types of operations the trainees would be best suited. The training school is located at one end of the yard, with a separate gate for the checking in and out of trainees.

Supplementing this intensive in-plant training, some pre-employment courses, given in cooperation with local vocational schools under state and county supervision, furnish an additional source of partially trained workers. The company also offers to employees already working in the yard an opportunity to increase their skills through advanced study, on the workers' own time, of a variety of subjects which cannot be satisfactorily included in the basic, highly simplified preliminary training.

Much credit for the success of the entire program is attributed to the Training Within Industry Branch of the War Manpower Commission, whose tested training patterns, widely known as J.I.T., J.R.T., and J.M.T., covering progressive stages in instructor and supervisory training, have been of primary importance. All instructors at St. Johns are now required to pass these courses as a prerequisite to teaching, and all leadermen are gradually being given some of this training in refresher courses designed to improve the quality of supervision in the yard.

The only criterion which can be used to judge the efficiency of a plant is the quality and speed of manufacture of its product. An examination of the available statistics indicates that this yard has done exceedingly well. For example, St. Johns delivered its twenty-fifth ship on December 31, 1943, exactly $16\frac{1}{2}$ months after laying the keel of its first hull. The first ship was delivered in April, one in May, two in June, and three a month from July through October, when the rate was stepped up to four

n November and five in December. Again, a comparison of United States Maritime Commission figures for the ime vessels are built on the ways hows that St. Johns in its fourth 'round" averaged 47.7 days on he ways against the national fourth 'round" of 49.8.

Thus the production record at this rard has shown a very consistent rate f improvement. To date the man- gement has devoted all of its ener- ies towards establishing a uniform mprovement in the production chedule.

Two months before the first ship vas launched, the yard established . Labor - Management Committee, vhose objective was to stimulate the roduction of every worker and to oster team spirit, which is extremely lifficult in a rapidly growing organi- ation without a core of long-time mployees. Through this Committee, rizes, authorized by the United tates Maritime Commission, have een awarded to over 250 persons se- ected from among contributors of ome 2700 suggestions turned in for eview. The Committee has also ponsored two launchings, for which ll details of the ceremonies, includ- ng the selection of sponsors, attend- nts and speakers, from the yard per- onnel were splendidly handled by bor members of the Committee.

In the early summer of 1943 the mployees organized a Recreation Association, whose activities are fi- anced by a nominal membership fee nd proceeds from various activities, uch as dances, sports events, and rofits from the sale of a souvenir ooklet published by the Association. he United States Maritime Commis- on made available a portion of one f the warehouses, which the Asso- iation has furnished with pool tables, ing pong tables, a small gymnasium, nd other equipment for games of all orts. In addition, the Recreation As- ociation presents a daily band con- ert during the day-shift lunch pe- od, which is broadcast to all sec- ons of the yard through a public ad- ress system. On the second shift a inch period program of recorded usic is presented in the same way. hree to five minutes of news, rought by direct wire from the ewsroom of a local radio station, is regular feature of both these pro- rams.

The company house organ, "Quar- r Deck," is a 12-page magazine lib- rally illustrated with photographs d written in a light style with a strong accent on names and personali- ties. The management has adopted, to a great degree, a "hands off" pol- icy in regard to this publication, and its popularity among all workers in the yard is proof of the wisdom of that policy.

Although differing in many char- acteristics from the other yards in the United States, St. Johns typifies what has been done in all shipyards and, for that matter, in all American in- dustry—the creation of enormous fa- cilities for the manufacture of war goods—the assembling of thousands of men and women, training and molding them into a vast production unit—and producing in ever increas- ing quantities—all in an incredibly short time.

Insert shows L. J. Fischer, chairman of the board. Seated, from left, are: T. W. Ryan, Jr., executive vice president; James C. Merrill, president; Kenneth A. Merrill, vice president. Standing are: Benjamin F. Crowley, vice president; Denis J. O'Mahoney, general manager; Earl D. Page, treasurer.

General view of shipbuilding ways and welding racks.

P.M.R.'S on a

Upper left: The Coast Guard crew that will man the ship.

Left: The ship's observers.

Below, left: S. James Taormina, American Bureau of Shipping.

Below, center: M. Chamberlin and C. McKay of U. S. Maritime Commission; Lieut. Thompson; Lieut.-Comdr. Reisinger and Lieut.-Comdr. Nunn of U. S. Navy; J. B. Pugh of the Maritime Commission.

Below, right: M. Petersen, U. S. Maritime Commission hull inspector.

(All pictures Official U. S. Navy photos by Nadaner.)

CAMERAMAN Patrol Frigate

The new frigate at dock.

Below, left: Looking forward from bridge.

Below, right: Joe Brady (second from left in back row), representing Joshua Hendy Iron Works, is surrounded by personnel taking instrument readings. S. J. Taormina of the American Bureau of Shipping is on his left.

High Pressures and High Temperatures

A Symposium on Marine Steam

On April 28, at New York, the Metropolitan Section of the Society of Naval Architects and Marine Engineers held a rather remarkable symposium on the subject, "High Pressure and High Temperature Steam for Marine Use." The published papers and discussions included: a paper on the "General Design" of such plants by R. H. Tingey, assistant technical manager, Bethlehem Steel Co., Shipbuilding Division; a paper on turbines by A. Kennedy, Jr., assistant to the manager, Engineering, Federal and Marine Divisions, General Electric Company; a paper on "Production of [such] Steam," by T. B. Stillman, marine manager, Babcock and Wilcox Company; and discussions by J. A. Davies, manager, Marine Engineering Department, and John S. Newton, application engineer, Steam Division, both of Westinghouse; and by A. S. Thaeler, acting chief engineer, Federal Shipbuilding & Dry Dock Company.

Starting with the steam generator, Mr. Stillman's paper shows that boilers of the marine type fitted with air heaters or economizers are of the same efficiency at 400 psi as at 1200 psi, so that the boiler unit is not so much of a factor in the low overall fuel rates usually obtained by going to higher pressures and temperatures. The reason for this is that the supplementary heating surfaces in marine plants are usually designed so that the uptake gases leaving those surfaces will be hot enough (300° F. or higher) to avoid "dew point" corrosion difficulties.

The principal builders of marine water-tube steam generators have had ample experience in building units for the merchant marine up to 1235 psi, 750° F., with air heater and economizer and with superheat and reheat control. The U. S. Navy has in successful use at least one forced circulation destroyer plant giving 1300 psi at 925° F. During the past 25 years, efficiency of merchant marine water-tube boilers has advanced from 79.7 per cent to 87.4 per cent entirely through the use of the air heater and superheater.

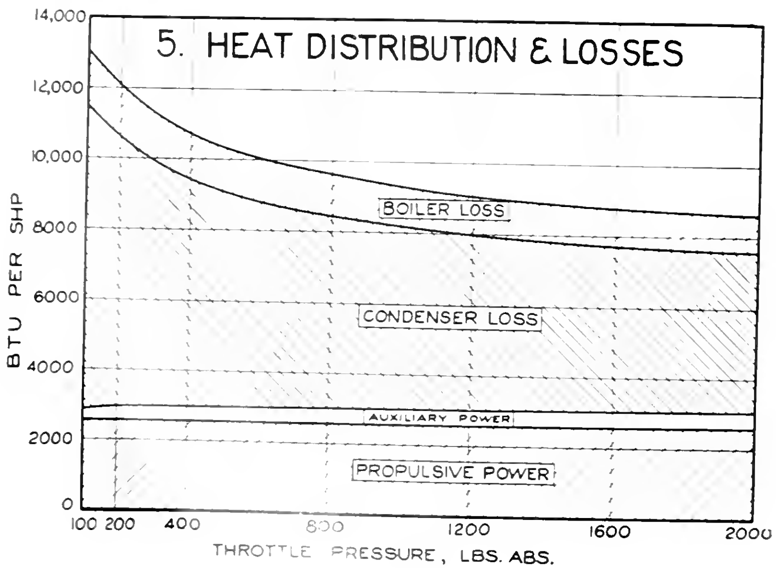
Passing now to the turbine, we quote from the paper by A. Kennedy, Jr.:

"The Maritime Commission have specified for their C-1, C-2 and C-3 ships, varying in rating from 4000 hp to 8500 hp, 440-lb. gage pressure, 750 deg. F. total temperature. These steam conditions are reasonable for the powers. They are building some slightly larger installations, using 590-lb. gage pressure and 815 deg. F. total temperature at the turbine throttle. These particular ships are electrically driven, and the total power of these ships exceeds 500,000 hp. The Atlantic Refining Company has built and operated for several years seven tankers using 700-lb. gage pressure, 900 deg. F. total temperature. Why was this marine turbine development using higher pressures and temperatures so successful? It is because we have had approximately 18 years of land turbine experience with 750 deg. F., eight years' experience with 900 deg. F., and six years' experience with 950 deg. F. steam. We have had 18 years' experience with 1200-lb. gage pressure.

"We therefore can and will build marine turbines for any pressure or temperature up to and including 1200-lb. pressure, 900 deg. F. total temperature, with or without reheat. We have already built marine turbines for these higher steam conditions. We are looking forward to having the marine fraternity specify modern machinery in all post-war building."

R. H. Tingey assumes standard steam conditions at present prevailing in the American Merchant Marine as 425 psi and 750° F., and explores possibilities of 1500 psi at temperatures from 850°-950° F. He comes to the following conclusions:

(1) The oil rate of a marine power plant using 600 pounds 850° without reheat is about .535 lbs./shp/hr., which is 6 per cent better than with standard steam conditions. These



steam conditions can be adopted very conservatively now.

(2) The oil rate using 1500 lbs. 750° and two steam reheat stages is about .51 lbs./shp/hr., which is 11 per cent better than standard. This type of machinery is thoroughly developed and is practicable for installation in powers over 10,000 shp now.

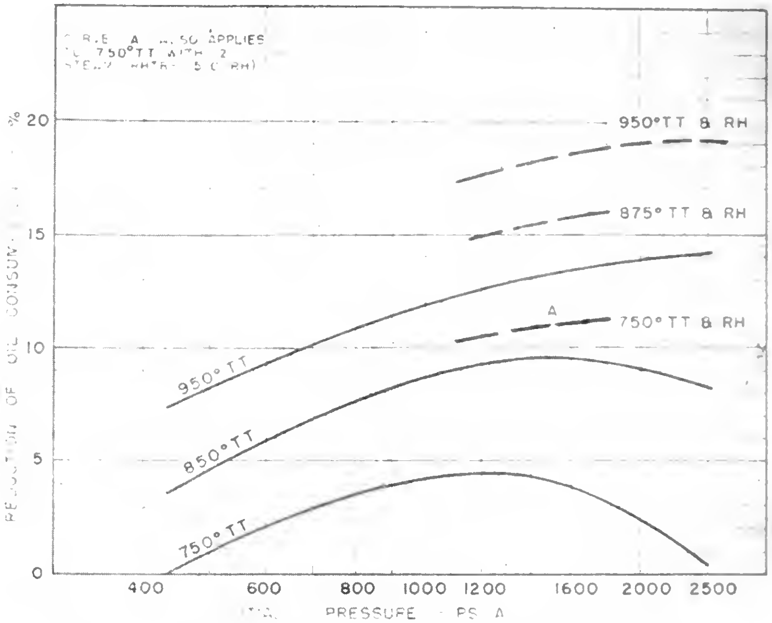
(3) The oil rate using 1500 lbs. 950° without reheat is about .495 lbs./shp/hr., which is 13 per cent better than standard. This power plant is feasible, but it entails more risk, due to high temperature, than can be justified by its small gain over the 1500 lbs. steam reheat plant.

(4) The oil rate using 1500 lbs. 875° with gas reheat to the initial temperature is about .48 lbs./shp/hr., which is 16 per cent better than standard. This installation is practicable now, and has the lowest oil rate, but is somewhat more complicated than the others.

(5) The cost and weight of 1500-lb. machinery will probably be 0 to 5 per cent greater than for standard machinery, depending upon the cycle adopted, and such machinery can be accommodated in the same space.

In his discussion, J. A. Davies states the viewpoint of the designing marine engineer, as follows:

"We are intent upon placing reliability ahead of anything else, and not until the background is sound and the development work necessary has been carried out sufficiently to know that another advance can be made aboard ship without fear of undue difficulty do we take that step. Fortunately for our shipping industry, there has been a greater degree of open-mindedness on the part of marine designers with respect to the development work done in collateral branches of the profession. No longer does the thoughtful marine engineer dismiss a reference to power plant engineering with the bald statement that land experience does not apply to marine engineering. For the past several years much of the valuable experience gained on shore with pressures and temperatures higher than those used on board ship has been applied to the construction of marine turbines, to the distinct thermal and economical efficiency of the latter. Blade shapes, nozzle design, blade fastenings, the efficiency of insulating material, the support of the turbines to avoid distortion, have all been studied in connection with land machines and applied most successfully to marine apparatus.



Curves showing percentage gain of higher steam pressures and temperatures as compared with present standard of 425 psi and 750° F.

"Whether it be a unit for a 4000-shp low speed cargo vessel, or the 53,000-shp unit for a major naval vessel, the progress is in the forward direction with pressures and temperatures that are no longer considered unduly high, but which have all been tested and have proved to be satisfactory, not only for the steady run of a merchant ship at a uniform power output, but also for the variable speed operation of a naval vessel under wartime conditions.

"The thermodynamic advantages have been discussed in a thorough manner, and the gain in turbine efficiency can readily be calculated.

"The net gain to the shipowner has not been as clearly portrayed, and, after all, in spite of the careless manner with which costs have been considered recently, it is the income from the investment that still stands as the criterion for acceptance or rejection of a business proposal."

John S. Newton looks at the marine steam power plant from the very practical viewpoint of the application engineer. Says he:

"Marine propulsion machinery is expensive because it is precision-made machinery, it is normally manufactured in small quantities, and it has been 'tailor made.' Little can be done about the first two items, but it seems to me that the marine industry can and should standardize on steam conditions, sizes, propeller speeds, steam cycles, feed heating cycles, or anything else which effects a reduction in the first cost of apparatus, and I believe it can be done without adversely affecting the fuel cost.

"On the basis of experience ashore it would appear that (except for reheat cycle installations) the throttle pressure of marine plants should be 600 to 900 lbs. for the 10,000- to 40,000-shp plants and 450 to 600 lbs. for 6000- to 10,000-shp plants. Initial temperatures would be 850 to 925 degrees and 750 to 900 degrees respectively.

"The present tendency ashore, however, is to exploit temperature to the limit before adding the complexity of reheat. In view of existing experience there could be little question that the power plants would operate satisfactorily and without undue experimentation, but I believe an economy study will show that, except for the larger plants (and there are relatively few built) neither reheat nor pressures or temperatures greater than those suggested will prove economical."

A. S. Thaeler cites comparative savings in actual figures, as follows:

"On two ships of the C-3 type, one with steam at 450 psi and 750° F., the other with steam at 1500 psi and 950° F., the respective daily fuel consumption would be 51.5 and 44.2 tons at $1.50 per barrel, or $10 per ton. On a 10,000 mile round trip one

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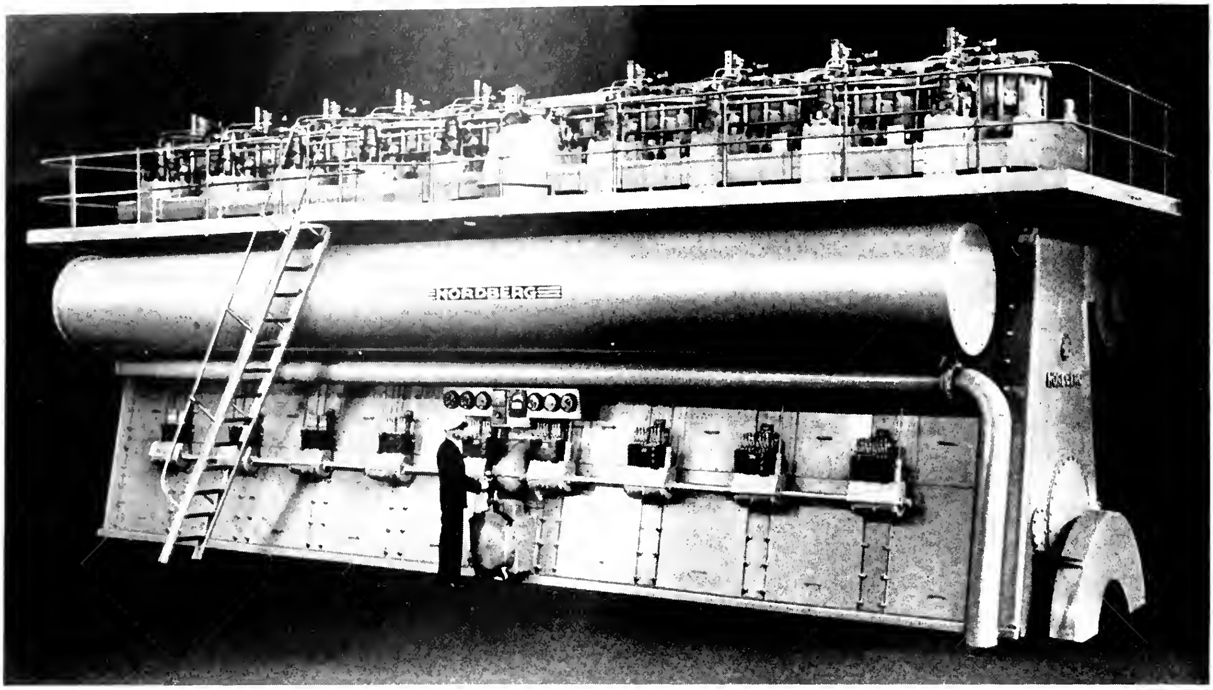
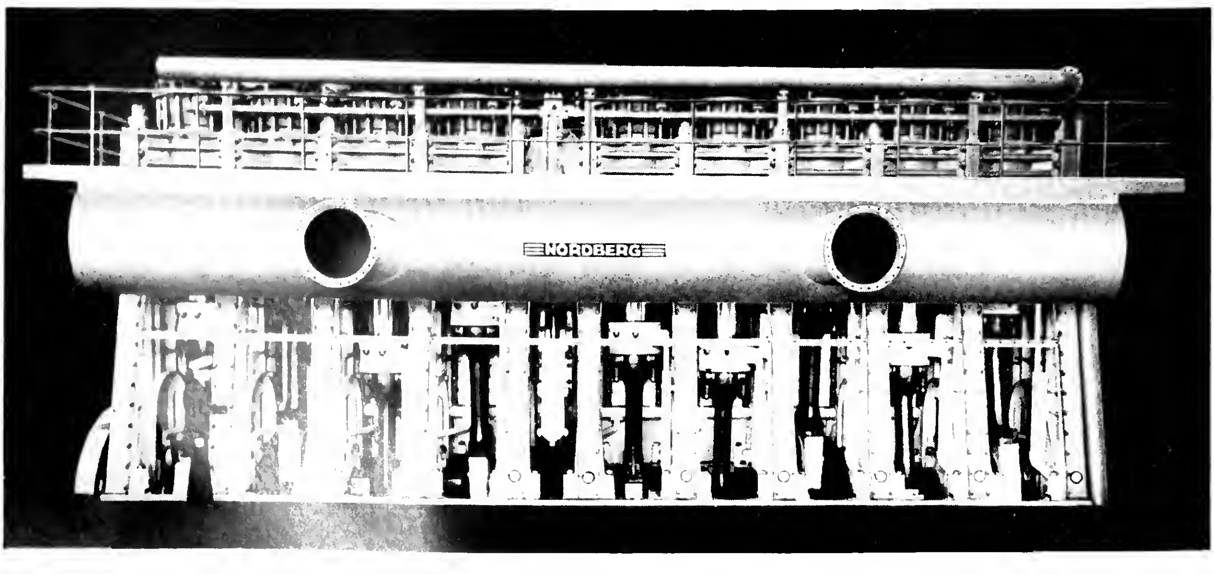


View of the 6000-shp marine diesel engine.

THE NEW VICTORY DIESEL

The engine with covers removed to show accessibility.



NORDBERG Manufacturing Company of Milwaukee, Wisconsin, announces with justifiable pride the successful completion of official tests of a 6000-shaft horsepower, 29-inch bore and 40-inch stroke, 9-cylinder, 2-cycle, single-acting marine diesel which is to be installed in one of the "Victory" ships of the U. S. Maritime Commission program. This engine design will now be available in from 6- to 12-cylinder inline types ranging from 4000 shp to 8000 shp, arranged for either single engine direct connected single screw drive, twin engine direct connected twin screw drive, or twin engine gear connected single screw drive.

The design follows the sound engineering lines that one has learned to expect from Nordberg engineers. Simplicity, ruggedness and accessibility, combined with streamlined appearance, produce another thoroughbred prime mover with all the marks of this company's experience and skill.

There are two departures from standard Nordberg design in this engine, as will be noted in the drawings herewith. One is the reversing mechanism and cam shaft drive, the other is the overhead location of the cam shaft.

Engine Frame

The bed plate is cast in two sections which are fitted accurately and bolted together. On top of this bed plate and fitted and bolted to it are eleven A frames supporting the cylinder blocks and the crosshead guides. Each cylinder block is cast separately and is fitted and bolted to its neighbor and to the tops of the A frames. The bed plate cross webs carry the bearings for the crankshaft journals. These bearings are removable steel shells lined with special contrifugally cast anti-friction metal. Journals and the crank pins are 20" in diameter.

Special heavy steel tie rods, one at each side of each A frame, are anchored below the web supporting each journal bearing and extend up through cored holes in the A frame and the cylinder block to a heavy steel nut which is tightened by a special hydraulic jack to insure an equal tension on all the tie rods and equal compression on all the cast iron members.

Cylinder Liners

A patented system of scavenging air and exhaust porting of two-cycle diesel cylinders is applied to this engine as well as to all other Nordberg diesels of the two-cycle type. Lubricating oil is introduced at seven points on the periphery and near the upper end of each liner by a seven-feed specially designed lubricator having a separate pump unit for each feed. These lubricators are driven from a layshaft located at convenient height above floor level and timed to deliver lubricating oil to each piston at a predetermined point in its stroke.

A wiper ring assembly attached to the bottom of each cylinder liner consists of a casting containing two pairs of internal expanding wiper rings which fit the skirt of the piston and wipe off excess oil, returning it to the crankcase, while carbon particles and other foreign matter drain into a recess in the casting, thence into a header leading to the sludge tank located in the ship's bilges, from which it is discharged over the side, thus obviating contamination of the lubricating oil in the system. The wiper rings are arranged so that the upper pair wipes the piston on its down stroke and the lower pair wipes on the up stroke.

Automatic plate valves located in the scavenging header and adjacent to the scavenging air ports of each cylinder prevent the back-flow of exhaust gases and contamination of incoming scavenging air. Scavenging air is furnished by two separate motor-driven centrifugal blowers which discharge through separate connections to the scavenging header. Pistons are made in two parts, i. e. head and skirt. Piston heads are cooled by

GENERAL DATA

Shaft Horsepower (normal)—6000.

Overload Capacity—10% continuous; 25% for two hours.

Brake Mean Effective Pressure at 6000 shp Rating—62 psi.

Speed—160 rpm.

No. of Cylinders—9.

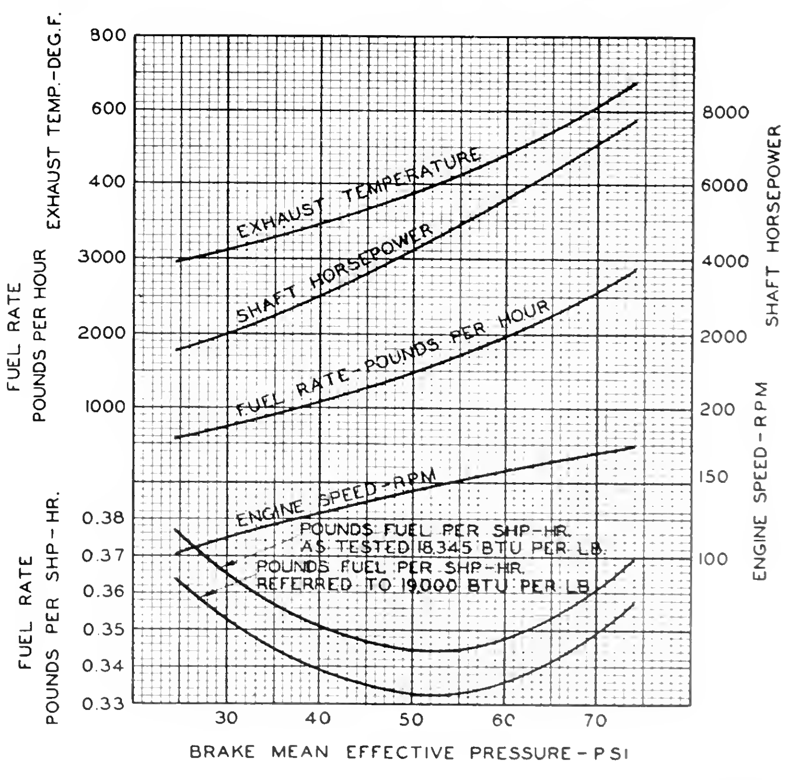
Cylinder Bore and Stroke—29" x 40".

Type of Engine—2 cycle, single acting, crosshead.

Type of Fuel Injection System—Mechanical.

Type of Scavenging Blower—Centrifugal, motor driven.

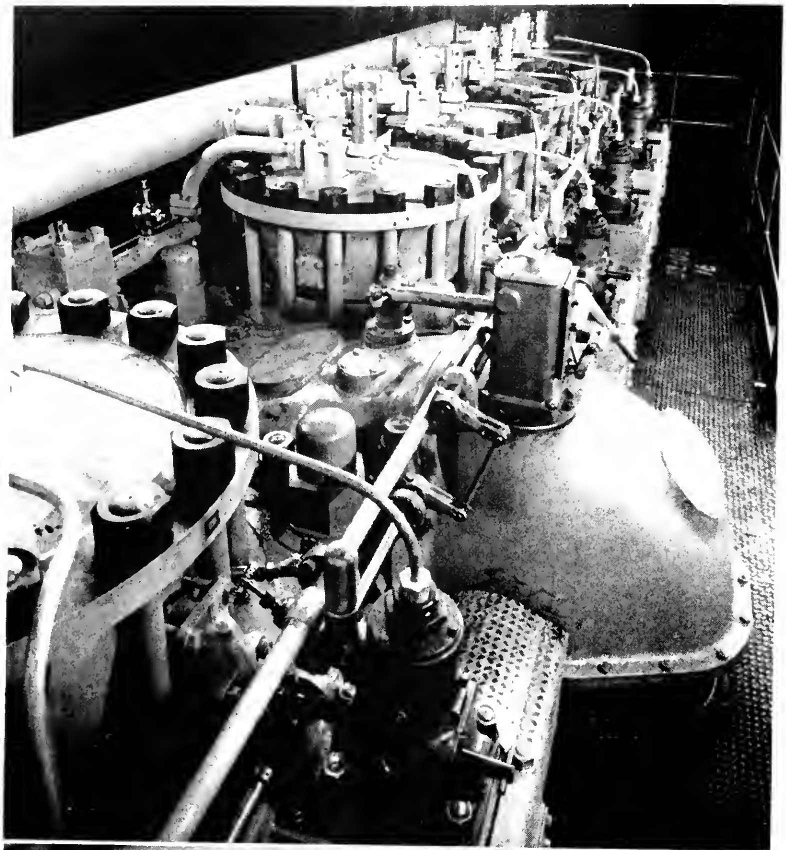
Test results of the engine. Results shown do not include power to drive scavenging blower.



circulation of a large quantity of oil at high velocity through labyrinth passageways cast in the head. The piston skirt rests upon a flange of the crosshead proper, to which it is centered and fastened by easily removable cap bolts.

Lubrication System

The bearing and camshaft gear drive lubrication system is of the pressure-feed type which delivers oil under pressure to all working parts of the engine through a large header located in the crankcase with leads to all bearings and camshaft drive and reversing gears. Both webs of each crank are drilled to conduct lubricating oil to the crankpins, crosshead pins and to the oil-cooled piston heads through a large drilled passageway in each connecting rod. Oil from bearings, gears and piston heads returns to the sump from which it is delivered by a motor-driven pump through a shell and tube type oil cooler and a filter to the main lubricating oil header in the crankcase.

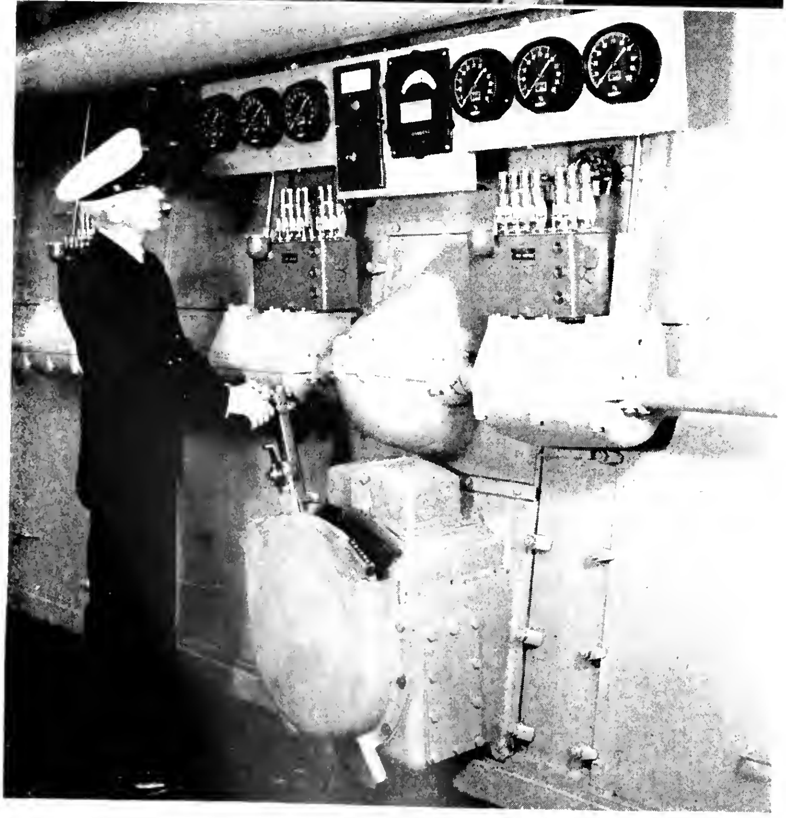


View at upper gallery.

The engine is controlled by a single lever located on the port side of the engine. This lever controls the starting, fuel regulation, reversing and stopping functions of the engine through a simple mechano-pneumatic system with dependable interlocks which prevent improper manipulation and damage to the engine.

Camshaft Drive and Reversing Gear

The camshaft drive is a train of gears incorporating a simple and ingenious reversing mechanism which has been employed over a period of many years on Nordberg reversing steam engines driving mine hoists. The gear train consists of seven gears including the driving gear which is mounted upon the integrally flanged crankshaft coupling halves by which the two parts of the shaft are bolted together between the fourth and fifth cranks. The reversing process consists of controlling the angular relationship between camshaft upon which the fuel cams are mounted, and crankshaft through the four-gear reversing mechanism incorporated in



Control stand and gage board.

the camshaft gear train as shown in the sketches.

Accessibility

Large oiltight, lightweight covers which are easily handled by one man enclose the spaces between the "A" frames on both sides of the engine and, when removed, admit men into the crankcase from either side of the engine for inspection and maintenance. The overhead location of the camshaft greatly enhances accessibility to the crankcase. Fuel pumps, governor and control shaft are readily accessible from the engine platform.

Fuel Injection System

The mechanical injection equipment on this engine was developed by Bosch from designs evolved in collaboration with Nordberg engineers. The fuel pumps are the largest of their type ever made in this country, and special consideration was given to physical dimensions as well as to mechanical details.

Tests and Results

This engine was completely erected in the company's shop and given the following tests:

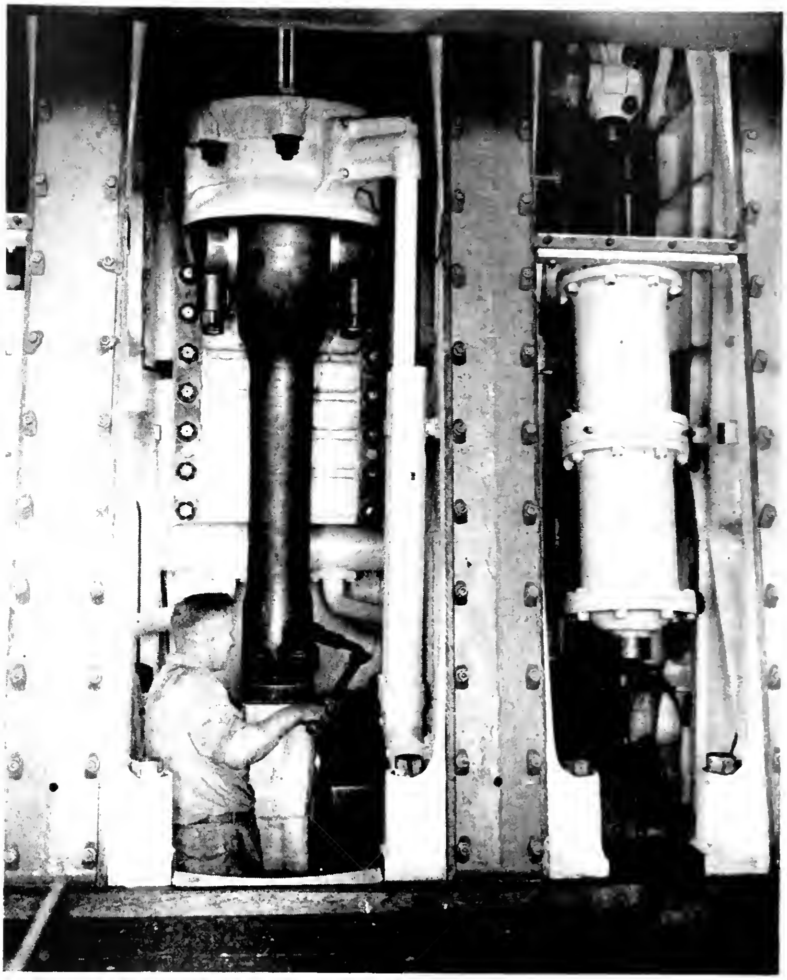
(a) 360 hours' continuous endurance run with the engine developing normal shp of 6000 at 160 rpm.

(b) 48 hours' continuous run at 110% load or 6450 shp at 165 rpm.

(c) 2 hours at 125% load (7300 shp at 172 rpm.).

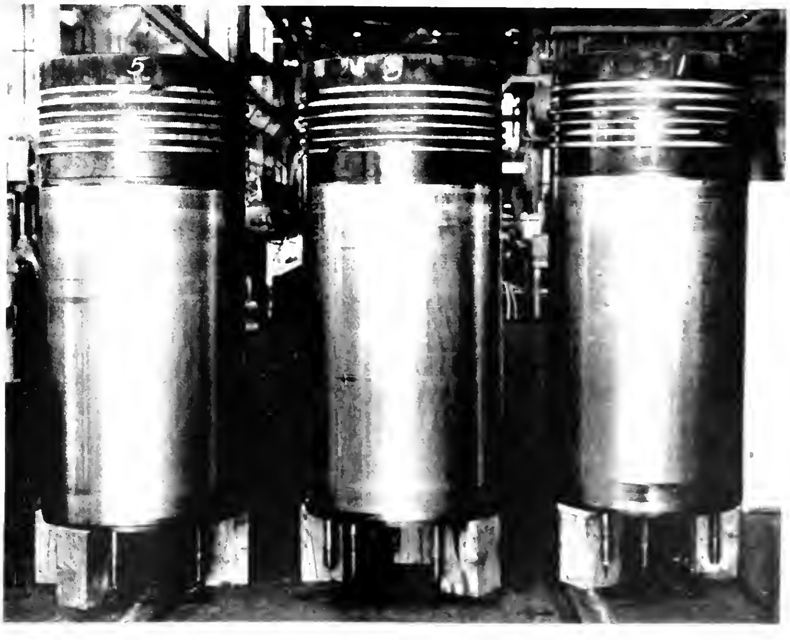
Other tests were run to determine starting, governing and maneuvering characteristics, and fuel consumption at various loads with corresponding propeller rpm. All tests were conducted with the engine burning heavy fuel oil, and the fuel consumption results are shown on the attached curve. The fuel consumption as shown does not include the power to drive the scavenging air blowers. This power will be obtained from the auxiliary generating sets aboard the vessel. The input to the blower at normal is 430 bhp.

The fuel consumed during the continuous 17-day test at 100%, 110%,

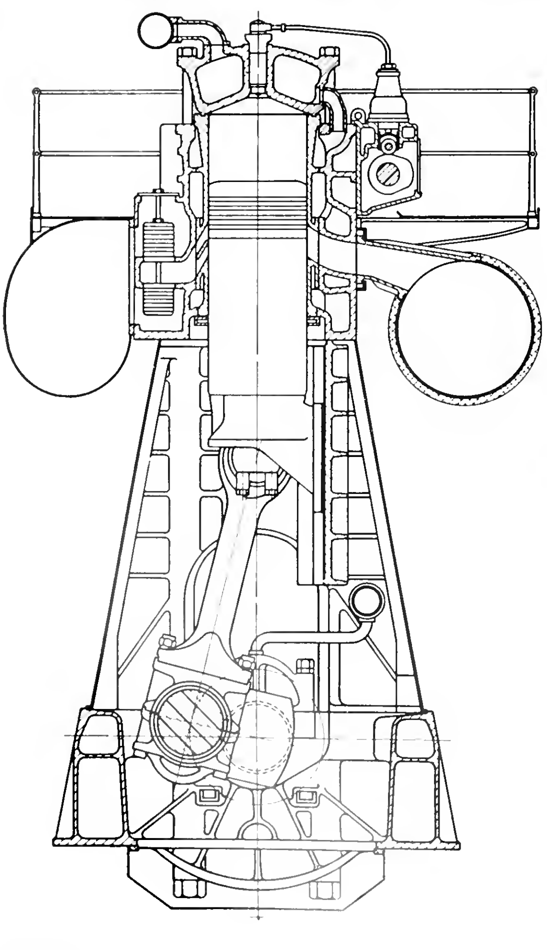


View showing accessibility to pistons, reversing mechanism and other parts within the framing.

Pistons after completion of 17-day continuous test at full, 110 per cent and 125 per cent load of the engine.



An injection nozzle after completion of 17-day continuous test at full, 110 per cent and 125 per cent load of the engine. Fuel oil burned, 1000 to 1450 S.S.U. at 100° F. Total time between inspections, 550 hours.



Cross-section of 29-inch bore, crosshead type Nordberg diesel engine.

and 125% loads varied from 1000 to 1200 S.S.U. at 100° F., 11.5 to 12.5 Baume at 60° F., and contained from 11.4 to 17% hard asphalt and 9 to 10% Conradson residue.

Prior to the beginning of official tests, heavier fuel oils of 1400 to 1600 S.S.U. at 100° F. were consumed over long periods of time with clear exhaust and with no difficulty. No changes were made in the fuel injection equipment, and there was no noticeable change in fuel consumption.

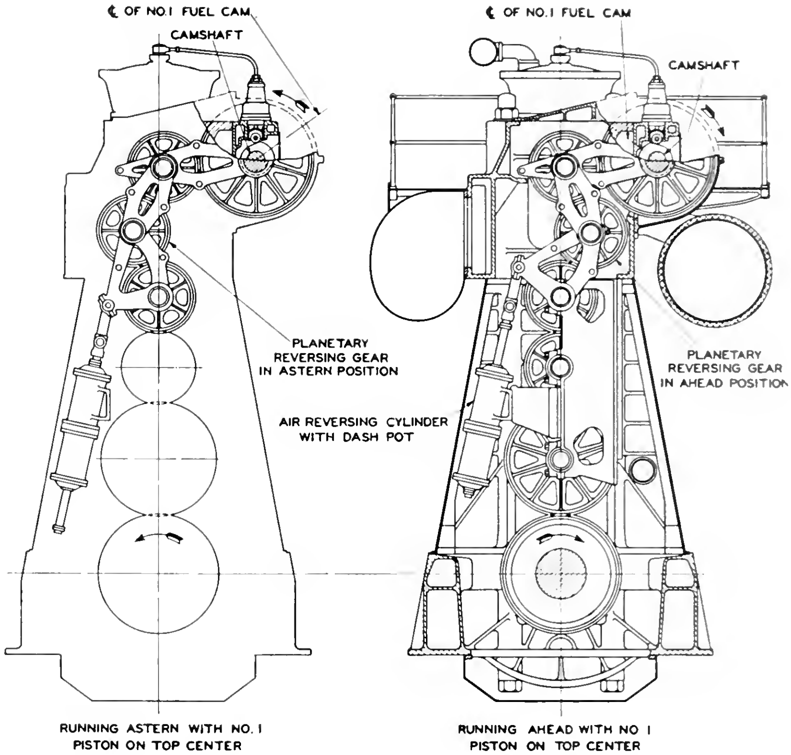
The photographs of the fuel nozzles and pistons taken immediately after completion of the 17-day test and during the official post test examination of the engine show unusual cleanliness of the injection nozzles and pistons. Cylinder liner and piston ring wear was imperceptible and all rings were free.

The results of exhaustive tests of this engine indicate that it will successfully operate on heavy, low-grade fuel oil.

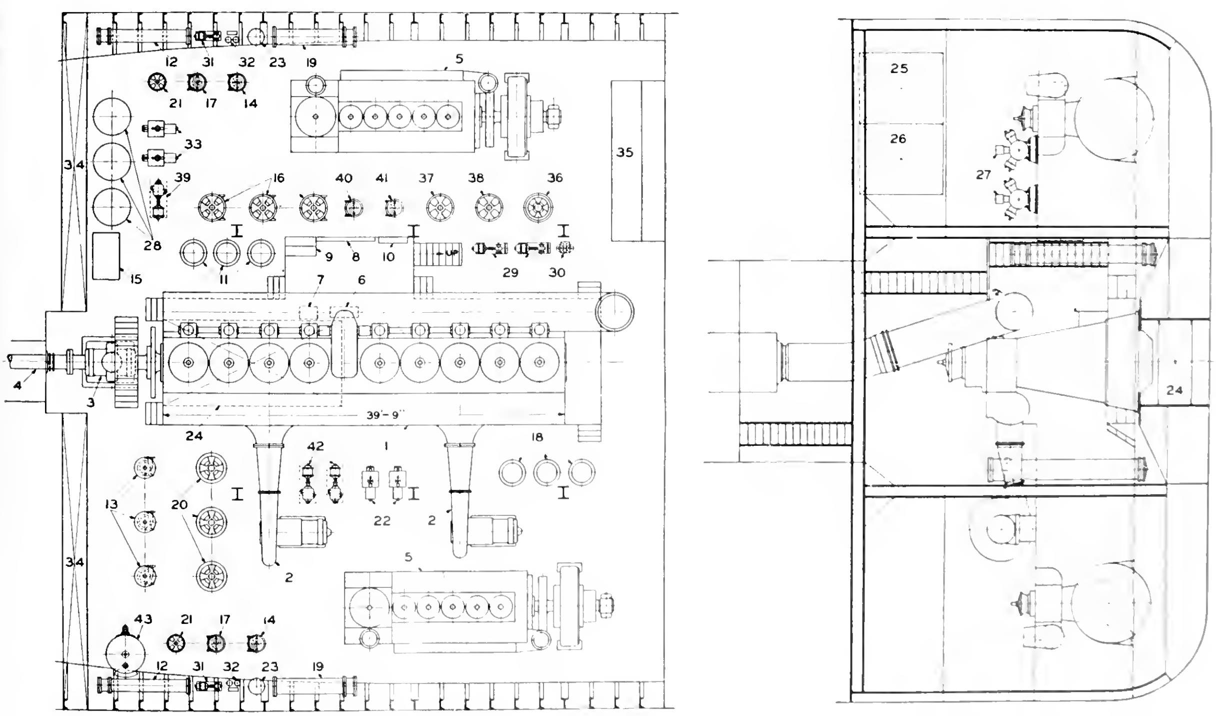
The standard engine speed of 160 rpm for marine service is low enough for direct drive with suitable propeller efficiency in single or twin screw ships, but the engine may also drive through a reduction gear set with optimum propeller efficiency. The engine may be operated through its entire speed range without encountering harmful peaks of torsional vibration.

KEY TO NUMBERED PARTS OF ILLUSTRATION BELOW

1. One 6000-shp Nordberg main diesel engine.
2. Two centrifugal scavenging blowers.
3. One Kingsbury thrust bearing.
4. Propeller shaft.
5. Two 800-kw Nordberg diesel generator sets.
6. One control stand.
7. One engine telegraph.
8. One gage board.
9. One log desk.
10. One alarm panel.
11. Three fresh water coolers, main engine.
12. Two fresh water coolers, gen. engines.
13. Three fresh water circulating pumps, main engine.
14. Two fresh water circulating pumps, gen. engines.
15. One fresh water sump tank.
16. Three salt water circulating pumps, main engine.
17. Two salt water circulating pumps, gen. engines.
18. Three lube oil coolers, main engine.
19. Two lube oil coolers, gen. engines.
20. Three lube oil pumps, main engine.
21. Two lube oil pumps, gen. engines.
22. Two lube oil centrifuges.
23. Two lube oil purifiers.
24. One lube oil sump, main engine.
25. One lube oil storage tank.
26. One lube oil settling tank.
27. Two starting air compressors.
28. Three starting air tanks.
29. Two fuel oil booster pumps, main engine.
30. One fuel oil filter, main engine.
31. Two fuel oil boosters, gen. engines.
32. Two fuel oil strainers, gen. engines.
33. Two fuel oil centrifuges.
34. Two fuel oil settling tanks.
35. One main switchboard.
36. One F.O. transfer and ballast pump.
37. One fire pump.
38. One fire and sanitary pump.
39. One sanitary pump.
40. One ballast pump.
41. One bilge pump.
42. Two fresh water pumps.
43. One evaporator.



Schematic arrangement of reversing gear for the 29-inch bore engine.



MACHINERY ARRANGEMENT OF A VESSEL PROPELLED BY A NINE CYLINDER, 29" BORE, NORDBERG DIESEL ENGINE

Trescott S. White

Torsional Vibration for the Operator, Owner and Builder

By Trescott S. White

The important subject of torsional vibration, usually cloaked in the language of mathematicians and designing engineers, should be thoroughly understood by every boat owner or operator, as well as by shipbuilders and installation engineers. This article is written for the purpose of conveying to men in this category what is meant when told a boat has "criticals."

A working knowledge of the fundamentals of torsional vibration can be obtained by anyone, although only a few specialists know, and need to know, the extremely elaborate and detailed technique of making the actual calculations. However, any man who handles a wheel, or sets an engine speed, should understand the subject and its relation to his particular ship.

The author is an engineer with Enterprise Engine & Foundry Co., San Francisco, California. He has been with the company since his graduation from the University of California in 1934, and is a member of the American Society of Mechanical Engineers and of the Society of Automotive Engineers.

It should be first understood that every reciprocating engine has torsional criticals which refer to speeds at which it is either unsafe or noisy to operate. Criticals are found in every boat operated by reciprocating engines, gasoline, steam or diesel. Sometimes these criticals are below operating speeds, and therefore passed through too quickly to be noticed. In other installations, the criticals may be above the operating range, and, as they are never reached, escape notice. However, when the critical falls within the operating range, this "rough spot" may break the shafting or at least create objectionable vibration.

In Figure 1 the torsional conditions are shown for a long shaft installation, such as found in purse seiners, tuna clippers and similar vessels. Long shaft means that the shafting is long and of fairly small diameter as compared to shafting used in tugs, towboats and tankers. Often the shaft diameter in a long shaft installation is the minimum size permitted by the American Bureau of Shipping Rules. Note that the operating range of this engine from 150 to 400 rpm is completely free of all torsional criticals. At 100 rpm there is a rough spot, or critical, but this may be easily passed through quickly.

However, if this boat engine were operated continuously at 100 rpm the following conditions would result: a noisy gear train, knocking at the stern bearing, a fairly evident shaking of the entire ship, and the heating and possible breakage of the intermediate shaft at a point about midway between the engine flange and the tail shaft flange. It is therefore apparent that in order to prevent serious damage, operation should be avoided at engine speeds where excessive vibrations are experienced.

Figure 2 shows the torsional stress and critical speed conditions for a

Fig. 1

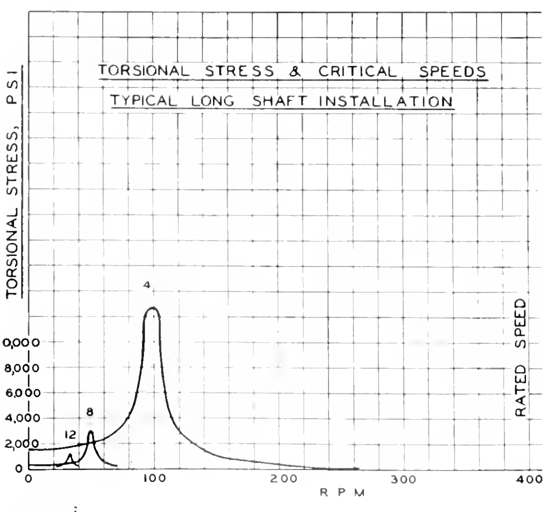
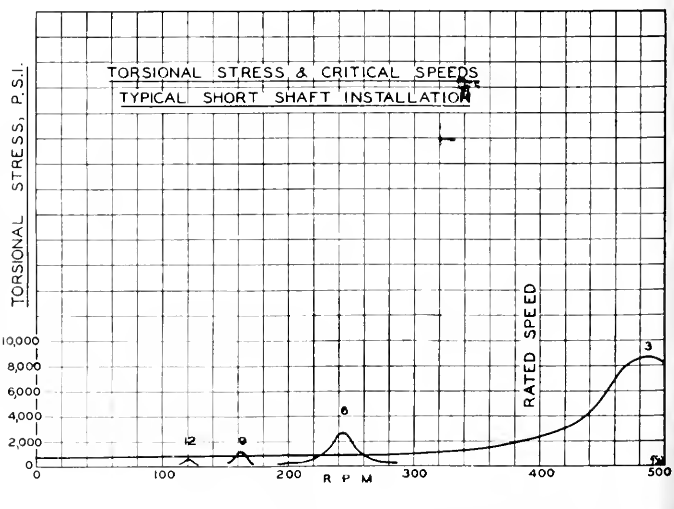


Fig. 2



typical short shaft installation, such as is used for tugboats, towboats, trawlers, draggers, tankers, etc. In order to keep major criticals out of the operating range in this type of vessel it is necessay to increase shafting diameter considerably above the minimum requirements of the American Bureau of Shipping. As shown in the curve on this chart, the operating range 0-400 rpm is free from dangerous criticals. Above 440 rpm, or around 450 rpm, the noisy conditions indicative of torsional vibration would be noticeable. There might also be a small amount of noise at 240 to 250 rpm, but this is not a major critical, the stress in the shaft is not excessive.

From a review of the information plotted on these two charts it is evident that with the proper selection of shaft diameter the worst criticals are either forced to a spot considerably above the operating speed or to a point safely below the lowest operating speed. With the determination of torsional stress and criticals now an exact science, alert engine builders are glad to advise the proper intermediate and tail shaft diameters to produce the best possible conditions for a particular installation.

In addition to rendering this advisory service, the engine manufacturer should supply each owner and operator with a curve chart similar to the ones reproduced in this article. In representative cases the manufacturer may also send a technician with special equipment to the vessel and measure the size and location of the criticals while under way. Even if this is not done, the research engineering department of the engine company will appreciate advice as to speeds at which excessive vibration is encountered.

Before discussing the cause of torsional vibration it should be borne in mind that all shipboard vibrations are not caused by this factor. Many kinds and types of criticals develop in a vessel which cannot be corrected by modifying shaft diameters.

A stern post of excessive width and blunt non-faired edges may result in a vacuum around the propeller blades at certain speeds. This condition, known as cavitation, will produce a hull vibration and stern bearing knock which appears very similar to a torsional critical. The same condition can be caused by a bent or unbalanced propeller blade. In some vessels, a swaying of the engine from side to side on its foundation when starting or slowing down may appear to be caused by shaft torsionals, but in reality is a result of foundation stiffness. Finally, it should be understood that each individual part of the ship has a vibration period of its own, but fortunately these are usually far above operating speeds and are therefore only slightly evidenced and seldom noticed.

Some types of non-torsional vibration may be objectionable. This will be found true in vessels with steel hulls where the pilot house roof, or deck, or some other fairly large panel or piece of equipment, such as a fire pump, vibrates noticeably at certain engine speeds. The remedy in these instances is to add a stiffening angle member to the panels showing excessive vibration.

We now come to the question, "Just what is a torsional vibration?" It is best described as a winding up and unwinding of the crankshaft. Every time a cylinder fires the shaft twists to some degree, and each time a cylinder comes up on compression the shaft untwists. Thus in every engine there is a tendency for the shaft to wind and unwind.

Consider the subject in this manner. Suppose the propeller of the ship is held in a vise while the front end of the engine shaft is twisted and then released quickly. The shaft would on release twist to a degree in the opposite direction. For the sake of illustration, we will assume it twists in the opposite direction ¾ of an inch. As it unwound from this position it would twist in the original direction of the twist ½ of an inch and then to the opposite side ¼ of an inch, and continue in this motion until it finally comes to rest.

The speed with which the shaft twisted back and forth is called its natural frequency, or normal speed of vibration. An instrument attached to the front end of the engine could measure this frequency. However, if the length and diameter of the shafting, and data on the engine and propeller, are available, the speed of the twists can be calculated with a degree of accuracy.

Two definite facts are now established. One is that every shaft tries to wind and unwind each time a cylinder fires. The second point is that every application has a particular frequency, or speed of vibration, which is common to that particular installation.

The problem of overcoming damaging or objectionable criticals simply involves choosing an operating speed so that the number of firing impulses per minute does not agree with the system's natural frequency, or of changing the natural frequency of the system so that it is different than the number of firing impulses per minute.

In actual practice the engine speed is generally determined when the engine is specified, leaving shaft stiffness the only factor that can be changed. However, shafting-length is also determined by the type of vessel, leaving only the diameter of the intermediate and tail shaft for consideration. If unfavorable torsional conditions are encountered, the diameter of the shafting can be changed. Fortunately, a relatively small change in shaft diameter results in a great change in the natural frequency. Because of this fact, it is usually possible to arrive at an arrangement that is torsionally satisfactory. The determination of the proper shaft diameter is an important consideration that cannot be overstressed. It is the key to overcoming the adverse operating effects of torsional vibration.

The boat builder needs to understand the following salient points about torsionals, which are summarized as follows: Keep major criticals out of the operating range. To get them above the maximum speed, use as light a flywheel as possible (that is with low flywheel effect or WR^2), use the shortest possible shaft, and use a relatively large shaft diameter, as the diameter has a greater effect than either propeller weight or shaft length.

To keep criticals below the operating range, use as heavy a flywheel as possible, the longest shaft possible and as small a diameter as will safely carry the normal horsepower load. The builder should have the engine manufacturer check American Bureau of Shipping rules for the recommendation on the smallest shafting that can be used, as shafts below their specifications are not desirable.

Many boats, due to the nature of design and work they perform, naturally fall into a "long shaft" class where, with comparatively small shafting diameters, the major criticals are kept below operating speeds. Many tugs and towboats require only a short shaft length that does not need too large a diameter. However, there are a few tugboats of the larger sizes where the shaft length falls between these two. The procedure in

(Page 108, please)

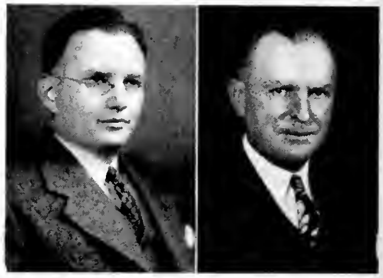
Pacific World Trade

By T. Douglas MacMullen

Port Business Created by Shipping

Above: Almon E. Roth, president National Federation of Shipping, who, with Russell Lutz (below, left) and Charles L. Wheeler (below, right) have taken a leading part in popularizing world trade.

(Photo by Harris & Ewing) *(Photo by Warner James)*



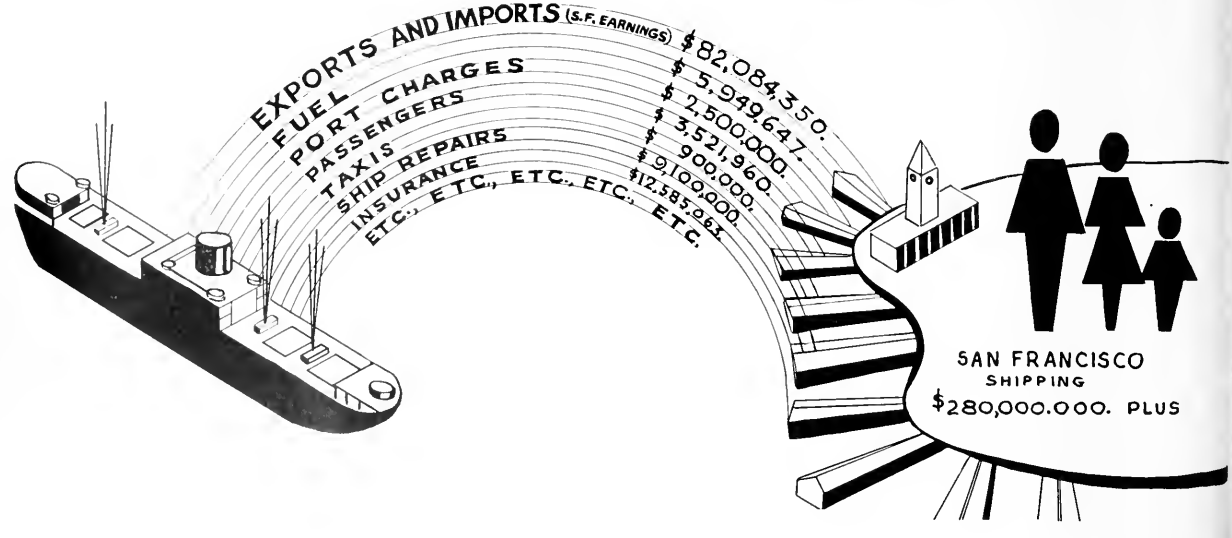
"Through the Golden Gate," it has been said, "flows victory in the Pacific." Flows also the lives of our armed forces, and the future of the nation and the world.

The same might be said of the Puget Sound, Columbia River, and Southern California harbors. The need for victory in the Pacific has given our ports a status that ranks with the battle areas in importance. When the war is over, the future of the nation will still, in some measure at least, be dependent on our ports.

To many people the port is a direct or indirect means of livelihood and success; to many others it is just a periodic headache, or so they think.

It is our purpose to emphasize the port values in the minds of the people—including the shipping industry itself. The figures quoted are not wartime figures, although we have them too. For the most part, they are for the last pre-war year, and provide a base from which the post-war trading era may be viewed. For convenience we are using San Francisco figures. Most of the unit values can be directly applied to other ports.

As a factor in national income totals, the actual income of the steamship companies of the U. S. is not impressive—less than one-tenth of one per cent. But the same amounts —$351,000,000 in 1929, $189,000,000 in 1937—take on a different meaning when distributed among the seaboard cities. So it is also with many other items that go to make up the nation's income but which directly accrue to the ports. Railroad freight on export and import shipments for instance. Much of this money is circulated in the terminal cities, and this is especially true of San Francisco, the home city of the Southern Pacific and Western Pacific, as well as of major steamship companies such as Matson, American Hawaiian, McCormick, and American President Lines, tanker operators Standard Oil and Associated Oil, insurance home offices and Pacific Coast general agencies, and banking chains such as Bank of California, Bank of



Pacific WORLD TRADE

America, American Trust, and Anglo-California, as well as Chinese and Canadian banks.

It should be noted that certain of the figures telescope; for instance, the item of shipping receipts is again listed as shipping companies' expenditures. This is because both totals are distributed in the port and benefit entirely different groups of people. The temptation is very great to distribute similarly the expenditure of the enormous sums collected by the railroads, truck companies, insurance and oil companies, banks, Harbor Board and others, and they should be included in any recital, but they are too widely diversified to permit segregation. Just keep in mind this fact as the other totals are presented, and as we finish with this list the full story of port expenditures is just beginning. Each reader will think of many more items.

Insurance

There are many forms of insurance that are affected by shipping operations, but of the $414,000,000 paid in premiums in 1940 in California, ocean marine insurance took $12,585,000. Such additional insurance items as Compensation may apply only when crews are in port, or be distributed among many ports, or routes. San Francisco benefits the most from insurance in the West because most of the premiums funnel through this city.

It is a peculiar fact, but one that we have not heard disputed, that both premiums and losses should be considered as assets in a list such as this, because both totals represent money put in circulation here.

Port Fees

Here are many items seldom thought of by those who look upon the Harbor Board as merely landlords. They build and manage waterfront improvements; but their fees, all of which are spent on harbor activities, include pier rentals, dockage, tolls, demurrage and belt line operations, which in turn include switching, car storage and track rental. In 1940 the cargo passing over the Commission's piers totaled 7,118,000 tons and the port fees ran to almost exactly $2,500,000. They were divided about as follows: 40% rentals, 34% tolls, 8% dockage, 7% demurrage, and 11% Belt Railway operations.

An interesting side light is the earnings of individual piers. Pier 30 earned for the Commission $104,202.94.

Water

Most services on the piers are included in the Harbor Commission's figures, but water is not. Each ship that required fresh water connection paid to the city $2.70 plus 25c per hundred cubic feet. This little item during 1940 totaled $28,432.

Fuel

This figure will be an approximation only, because it differs with every ship and with many factors on the bay. The Maritime Commission offers the following on Liberty ships: While at sea the ship uses 160 barrels per day; in port working cargo, 35 barrels per day; in port not working cargo, 25 barrels per day. The cargo size of the Liberty is pretty well recognized to be a fair average size for cargo ships in many respects. Particularly true in the matter of fuel and of crew size. In 1940 there were no Liberty ships and the prices for fuel were far different from those of today. The Bureau of Mines shows a purchase of oil for ship operation as follows: 16,225,000 barrels of regular fuel oil and 6,556,000 barrels of diesel. This was for California. It estimates that 75% was taken on in San Pedro, where the price was 75c per barrel as against 80c plus 4c barging in San Francisco, with diesel in proportion. The approximate figure for San Francisco was $5,949,647.

Supplies

Supplies are grouped, for the Liberty ship, a fair average, as follows:

Consumables: deck, $17.96 per day; engine room, $15.17 per day; steward's (food), $1.20 per day per man; steward's (other than food), $5.12 per day.

The figures contained herein were arrived at in consultation with M. H. Gates, George Jordan, T. F. Laedtke, John Williams, Frank Foisie, J. Boyd, Russell Lutz, W. A. Geary, Capt. May, Hugh Gallagher, Dearborn Clark, Ralph Myers, A. B. Poole, W. L. Montgomery, M. A. Cremer and Jeff Wilson.

The 4193 vessels docking at San Francisco in 1940 took on food supplies totaling $19,109,650, and supplies other than food $11,304,450.

Pilotage

The pilot fees in this harbor are, for vessels over 500 tons, $2 per draft foot plus 1⅛c per registered ton measurement. Pilots are used both in and out. The figures total $335,808.

Towing on the Bay

The cost for towing varies. Generally assisting a ship to dock is $25 to $40; moving from dock to dock, $75 to $150; assisting or towing to Bethlehem plant, $40 to $225; assisting or towing to Oakland, $50 to $225. We have assumed a low average of $50 for 3000 ships, total $150,000.

Crew Pay

This item is not capable of distribution, because crew pay is drawn at various ports on the basis of 50% of the amount then due, final adjustment being made in the home port. The amount drawn in San Francisco is large but incalculable.

Crew Expenditures

Operating officials of three steamship companies guessed that crew members, assuming a five-day stay in port, average $25 per man.

Ship Repairs and Construction

Because the pre-war ship repair picture in no way approximates the post-war picture, this figure is small. The U. S. Census Bureau shows that there were 17,000 people engaged in ship repair labor in 1940. Their approximate earnings, $9,100,000.

Longshore Labor

These figures are well known. Payments in 1940 for the Pacific Coast were $22,850,000. Of this amount 35% was at San Francisco, 25% at Seattle, 17% at Portland and 23% at Southern California ports. San Francisco's share, $8,000,000.

Carloading on Pier

Carloading fees average $1.20 per ton (2000 lbs.). Car unloading 80c per ton. The Chief Wharfinger and others estimate that two-thirds of 1940 tonnage reached or left the piers by truck and one-third by car. The figure for cars, $2,372,666. This is the loading and unloading cost. The freight charge is included in the Belt Railway receipts.

Railroad Freight

This is an item seldom thought of in connection with overseas shipping. Most of the tonnage reaches port

Pacific WORLD TRADE

from beyond this area, and the same is true of imports. How important rail facilities are to a coast port was indicated by the diversion to North, South, East and Gulf ports during the last strike in San Francisco. To give this figure its proper weight would be to make it unbelievable, so we have cut it in half to $56,000,000 to represent the amount turned over in San Francisco. We have assumed an average freight rate of 50c per hundred pounds, which will make many a shipper smile. Freight hauled in and out by truck, $5,813,000.

Drayage

Two-thirds of the pier cargo leaves or arrives by truck. The Railroad Commission tariff for carload lots within the first delivery zone from 7½c to 14c per hundred pounds. The average is 10c, the total is $9,490,668. Gasoline used, assuming a six-ton average load with five gallons per day per truck (Highway Carriers estimate), $300,000. Warehousing is hard to figure, but several estimates average $3,400,000.

Tourists in Port

Here the distribution of passenger traffic by class, by arrivals and departures, by origin and destination, and by flag of vessel would be interesting, but will have to make another story. San Francisco, with ⅝ of the Pacific Coast passenger traffic other than Alaska tourists, paid in fares at San Francisco $3,521,980. No calculation is made for transportation inland. Assuming an average stay of three days at $3.00 per day, 60,000 tourists spent in hotels $720,000, 44,000 spent in cafes other than hotels $88,000, in shopping $440,000, and in theaters $35,000.

Taxis

The Yellow Cab Company reports (for 1940) 500,000 passengers per month. Fifteen per cent of this figure was pier business averaging 50c; total $450,000 a year, with a like amount spent subsequently in shopping, theaters, cafes and sightseeing.

Telephones

Ship crews and passengers spent $27,939.

Value of Exports

From 1922 to 1931 the ten-year average tonnage for this port was 12,924,375. By 1940 it was 7,500,000, with values as follows:

Exports $178,760,917.

Imports $149,576,514.

Of this total San Francisco transactions ran to $82,084,350. (A side light on this is that the export ton averaged $44.39; the import ton averaged $94.67.)

Banks

The banks enter the picture in many ways, and while their fees and interest charges for discounts, etc., are a very small part of the total, they are a vital part. Probably $300,000 is a fair estimate of the direct interest of the banks in shipping activities, but their indirect relations with everyone concerned are valued much more highly.

Steamship Company Offices

With 128 steamship companies operating out of San Francisco and their overhead ranging from a few hundred dollars a year up into the millions, and their accommodations ranging from a sign on the door to owned buildings, an estimate of their expenses is very casual, for they do not segregate their expenses by cities. The 1940 U. S. Census report shows 11,200 persons employed in water transportation. With rentals, advertising, taxes, supplies, etc., a total figure of $31,203,000 has been agreed upon.

Conclusion

If you agree that all these figures are reasonably classed as representing port activities, you may add them together and find a total of some $280,000,000.

San Francisco's population, compared with that of the United States, justifies an estimate of total income at somewhere around $400,000,000 in 1940. (This is probably low, because San Francisco income is higher than national per capita average. "Sales management" estimates $668,000,000.) Money turns over many times, and the money the butcher and grocer get today may have been world trade money last week.

But that is not all; there are many other items, large and small, that cannot be computed, from the operations of labeling firms to the share of shipping in the ferry and river lines and even the bridges. There are items that do not pass over the piers, such as tremendous sugar shipments direct to the refineries, lumber operations direct to the yards, and all fishing activities. Then there is the whole class of customs brokers, average adjusters, and shipping and export agents. In the case of San Francisco, there is an entire area in the city that is almost synonymous with world trade—Chinatown. And if you want to think of something really big, and due to be bigger in the future than in the past, think of what happens when the Navy is in port.

Are you in world trade?

Other Coast cities have advantages to match those of San Francisco. The northern cities have lumber and fishing activities, as well as the tourist trade to Canada and Alaska, which in normal years exceeds all that of the rest of the Coast together. Los Angeles has its oil shipping as well as oil servicing volume, its citrus fruit shipping, its banana imports, its fleet activities and its added freight income between San Pedro and the industrial area.

And while we are thinking of post war, let us not overlook yachting.

China-America Council Organized in San Francisco

That the West is alive to the importance of future trade with the Far East is indicated by the interest being taken in the China-America Council of Commerce and Industry, of which Julean Arnold is West Coast representative.

The San Francisco Bay Regional Committee has been organized with Harry D. Collier, president of Standard Oil Company of California, as chairman, and Charles Kendrick, president of Schlage Lock Company, as vice chairman. Other members of the committee are: F. A. Bailey of the Matson Navigation Company; S. D. Bechtel of the W. A. Bechtel Company; Clay Bedford, Kaiser Co., Inc., Richmond; James B. Black, Pacific Gas & Electric Co.; Marshall Dill; Alfred W. Eames, California Packing Co.; Joseph R. Knowland, Tribune Publishing Co.; W. H. Lowe, Paraffine Companies, Inc.; A. T. Mercier, Southern Pacific Company; Weller Noble, Pacific Guano Company; E. L. Oliver, Oliver United Filters, Inc.; W. T. Ross, Columbia Steel Co.; E. L. Soule, Soule Steel Co.; Brayton Wilbur, Wilbur-Ellis Co.; J. D. Zellerbach, Crown Zellerbach Co.; and Adrien J. Falk, San Francisco Chamber of Commerce.

Pacific World Trade

Air vs. Surface Rates

Before the war, certain American firms shipped the kernels of peach pits to Holland. This item appears as one of the most insignificant in the statistical tables for 1939. Its place in the air picture is even more insignificant, as will appear.

Most of the casual discussions of the airplane in post-war competition with surface lines run to extremes. There is a singular lack of basic data on which judgment can be based, so a large part of the enthusiasm for air transportation is brought into being by the fact that war needs have brought abnormal plane use, and an abnormal disregard of cost. By the same token, the war has brought more clearly into focus the flexibility of the plane and the strategic value of speed in both war and peace.

The Association of American Railroads has just issued its "Initial Study of Air Transportation," and it supports and quotes President Patterson of United Air Lines, who has written and spoken in an effort to rationalize thinking about the plane's future as a transportation medium. Such of his figures as we use here are confirmed by other authorities.

For our traffic purposes, the post-war world is divided into domestic and foreign, and also into passenger and cargo-handling. Plane costs are based on present airline equipment such as is now in commercial use, and later in the article we will list prospective post-war adjustments.

Rail Freight

First a comparison with rail freight. An average train of 50 cars including 20 empties could haul 1560 tons of revenue cargo each way between Chicago and San Francisco in two round trips per month. The locomotive would consume 170,000 gallons of fuel oil, which at 2c per gallon would cost $3400. The crew would number 20 men in four shifts of 5 each, and their pay would be $5000 per month. The total cost, direct and indirect, based on 1940 experience, would be $50,000.

An airplane of the Mainliner type would have a lifting capacity of but 2½ tons, hence would require 626 round-trip flights to do the job the train did in two round trips, 2,500,000 flight miles against 8880 train miles. Obviously one plane could not make 626 round trips between Chicago and San Francisco in a month. The normal number of trips for one plane is 11, hence 57 planes would be needed to do the job of one train. These planes would consume 1,500,000 gallons of gasoline compared to 170,000 gallons of fuel oil by the train. The gasoline would cost $200,000, the fuel oil $3400. Four hundred pilots receiving $200,000 in pay would compare with the train pay roll of $5000. Based on recorded experience, the total operating cost of the 57 planes would be $1,750,000 against the train cost of $50,000, or 35 times as much.

True, the individual trip is faster, but at the end of the month we have just 1560 tons delivered at each end of the haul by either method. One Mainliner did approximately the work of one freight car in a month's time. There are 1,800,000 freight cars in the United States, and the number of cargo planes in operation before the war was 362. There are various estimates as to the number of cargo planes likely to be available at war's end. The highest number is 15,000. (Note: Due to short haul characteristics, the average freight train travels only 36 miles a day instead of the 300 miles of the example, but the plane efficiency would show the same deterioration, due not only to short hauls but also to the unbalance between directional movements and seasonal variation in volume. The comparison is a fair one.)

Mr. Patterson has figured that even if a plane could do the work of three freight cars it would take 600,000 planes to match the country's freight trains, and their year's consumption of 122 billion gallons of gasoline would be 2½ times the world's production, and the airline personnel would have to number 20 million.

Ocean Freight

In comparing the cargo plane with the ocean freighter, the figures are at least as startling as those of the plane-train comparison. Taking as an example a 13,000-ton-displacement vessel sailing from San Francisco to Brisbane with a revenue load of 6400 short tons, and assuming two months for the 14,000-mile round trip, the fuel oil consumed would be 425,000 gallons costing $9000. There would be 55 in the crew and their pay would

W. A. Patterson
(United Air Lines photo)

be $15,000. The total operating costs — probably high — would be $120,000.

The four-engined plane for this flight would carry 4 tons, so 1440 round trips would be required to carry the 6400 tons in two months which the freighter would handle in one trip. This would mean 21 million miles of flight compared with 14,000 miles of surface traveling. Assuming a plane round trip in six days or ten round trips in two months, 144 planes would be required. These would consume 18,000,000 gallons of gasoline against the ship's 425,000 gallons of fuel oil. $2,250,000 against $9000. Thirty-five hundred air crew men would get $3,000,000 in pay while 55 ship crew men would get $15,000. Total air operating costs would reach $29,000,000 against $120,000, or 250 times greater for the same job in ton-miles-per-hour. The comparisons are fantastic.

But here is another angle. 45,000 **tons** of gasoline would be required at refueling points every two-month period **to be delivered by tankers.** Assuming three tankers, it would actually take 144 planes **and three tankers** to do the job of one freighter.

Mr. Patterson has applied some of these comparisons to certain items of freight, for instance a small motor. By surface carriers from Chicago to San Francisco to Brisbane the freight would be about 4% of the value of the article; by air it would be 530% of the value, and this is a pretty fair average item. Acceptable, no doubt, in an emergency, but not for normal stock requirements.

Pacific WORLD TRADE

Peach Kernels

In 1942 there were 181,000 non-war shipments by air to 53 countries. The average weight was 16 pounds, or a total of 1448 short tons. This tonnage is almost exactly the volume of peach kernels shipped during the last normal year to Holland. Hardly a very frightening prospect for the steamship companies, and on the domestic scene air freight and express volume is less than one-tenth of one per cent of rail freight volume.

Passenger Traffic

It is in the field of passenger travel that the airplane will really grow in popularity, for with passengers the time element in 94% of the cases is more likely to tip the scale in favor of the plane than would be the case with freight. Comparisons have been made by rail and air between various sets of cities, and wherever the value of time is considered the results favored air.

Take a trip from New York to Seattle, for instance. The rail fare is \$110.83, lower berth \$27.67, meals and tips \$13.90, taxis at both ends \$1.10, total \$153.50. The air fare is \$151.64, taxis \$1.85 (meals and tips free), total \$153.49. Close enough. But in the case of the rail trip there are at least three business days lost, and with time between 9 a.m. and 5 p.m. valued at \$2.50 per hour the rail trip jumps \$60.00. Night flying reduces the business time lost by air to three hours, or \$7.50. Quite a margin in favor of air. In 1943, 2,813,000 passengers rode the planes for an average flight of 507 miles. The aggregate mileage was equivalent to less than 2% of the passenger mileage of Class 1 railroads.

In the post-war period the principal previous obstacles to air travel—the fears of family or employers and the uncertainty of schedules — will have been dissipated by the experience of the war, or will be offset by the encouraging factors, which include speed, frequency, saved business time, and prestige of air travel.

It is undoubtedly in the passenger department that the effect of air traffic will be felt, both by rail line and ship line, but in different ways.

John E. Slater, executive vice president, American Export Lines, estimated at a Propeller Club meeting that 40% to 75% of the former best-paying overseas passenger traffiic will be by air.

Mr. Patterson believes that the domestic air lines will obtain two-thirds of the Pullman business, one-third of the railroad coach, one-third of the interstate bus, one-quarter of the railway express, one-quarter of the parcel post and one-tenth of the less than carload rail freight, and that this traffic will require the capacity of 9000 Douglas DC 3 planes.

L. W. Pogue, chairman of the Civil Aeronautics Board, believes that the planes' cargo carrying value will largely be to remote areas.

But Dr. Edward P. Warner, vice chairman CAB, estimates that much of the air volume, cargo and passenger, over land and sea will be **new** traffic.

So far as ocean traffic is concerned, the concensus of both steamer and air executives is that for every passenger taken from the ships by air there will be both passenger and cargo traffic created. With every passenger a plane carries, and with every stop the passenger makes, a market for supplies develops; with every trip a plane makes a need for fuel develops; with every visit to a foreign city, the knowledge of both import and export materials spreads. Each trip makes another trip easier to contemplate. Herein is no doubt the greatest impact the plane era will have on the steamer trade — an impact for good. There is no spot on earth that will not be a potential market for U. S. goods.

Now as to plane improvements and lowered operating cost in the forseeable future. Dr. Warner furnishes an interesting table.

Character of Improvement

	Reduction in Operating Cost
33% red. in profile drag of wing, with 20% red. in parasite drag excluding wing	10%
5% inc. in propulsive efficiency	3
10% red. in specific fuel consumption	3
10% red. in unit wgt. of power plant	4
10% red. in structural wgt.	6
10% red. in wgt. of pass. accom.	3
20% red. in first cost of airframes	2
20% red. in first cost of engines	1
20% inc. in oper. time per plane per year	2
20% red. in airframe maintenance cost	1
25% red. in engine maintenance cost	2
50% red. in accident hazard	3
40% red. in ground oper. expenses per ton-mile	8
33% red. in general and administrative expenses per ton-mile operated	**3**

Dr. Warner does not expect the early accomplishment of all of these improvements but does expect an aggregate saving of about 15% in operation costs. He further justifies an advantage of 5c per ton mile for cargo planes as against passenger planes. But the lowest calculable air cargo rate does not compete with steamer rates. The 10c per ton mile minimum by air compares with a surface rate in **mils.**

Next Issue

In our next issue we will extend these rate comparisons to proposed steamship-owned air services. Not every steamship line **must** have its own air service.

Pacific WORLD TRADE

Bay Region Unity for World Trade

by P. A. Hoyt

How can I get you aroused? How may I spark your thinking and move you to action? Perhaps a critical analysis will help.

There is going to be a substantial amount of import-export business for the post-war U. S. A. That is a foregone conclusion, as there is a great pent-up demand in other countries with favorable trade balances, and many countries are planning industrialization.

Are the people in this area world trade minded? Some sections of the United States are. Britain and Russia seem to be. When I ask about being world trade minded, I am not thinking of you who are presently in world trade; I am thinking of the average business man and his family, labor, and agriculture as well. There will be strong pressure to maintain high employment, and this necessarily will focus attention on export trade. It gives us a rare opportunity to sell the importance of foreign trade to the general public and get their support. Juan Trippe of Pan American Airways recently said that world trade can create ten million new jobs in this country.

Quite recently Franklin Johnston of the American Exporter magazine said that the average exports of this country are about 8% of all goods manufactured, and of those companies which were in export trade the average output sent overseas was approximately 16%. We can best visualize this by thinking in terms of months of production. What does one month's total production in this area mean to the community? This percentage can be increased. We can keep alive our war-created industries by switching production to foreign trade. It is an educational problem. Manufacturers must be schooled in the importance of foreign trade and the necessity for setting aside a certain percentage of their monthly production for export markets. An export market is not to be treated like last winter's overcoat—something to be put on and off as the volume is needed to round out production. The development of foreign trade is a long-time project, and once the momentum has been generated it should be maintained. A great opportunity lies before us. Are we equal to it?

Is this area to be a "quiet fishing resort on the Pacific mill pond"? It could be. To listen to Glenn Martin, Howard Hughes, Juan Trippe and others, one might assume that all commerce will be by air, that it is no longer necessary to be located near the ocean in order to carry on world trade. We should properly equip ourselves for both air and ocean commerce.

Chicago, for instance, is planning a world trade port, flying direct from Chicago to foreign markets. It is generating a great deal of enthusiasm. New Orleans is planning a great air-and-water world trade port. It is very much alive to this possibility, and is hoping to have world commerce from the entire Middle West — such cities as Memphis, Louisville, St. Louis, Omaha, and perhaps even Denver—clear through the New Orleans port. Then, we know that in the past approximately 70% of the import-export business of the country passed through the New York district. Where does the West Coast come into this picture? Los Angeles is making plans and is doing things. Los Angeles has a great harbor and envies no one today. Los Angeles' lack of natural facilities spurred it on to greater efforts, and as a result it has made great strides in world trade. Prior to the war it had a large world trade department in the Chamber of Commerce and employed over 20 people in that department alone. It is restaffing its organization today and preparing for the future. For instance, just recently the Plomb Tool Company of Los Angeles issued a 106-page booklet in Spanish showing its line of new tools.

Need for Pioneers

Today there is a need for men of pioneering spirit, men willing to make sacrifices, and to work unselfishly for the development of this whole area. Sometimes it is said that we are still riding on the momentum generated by the 49'ers. One cannot coast for long without coasting down hill. Isn't there a need at this time in this area for virile young men—adventuresome, courageous, with vision—to lead us forward? It takes

P. A. Hoyt, executive vice president, Oliver United Filters, Inc., Oakland.

men like George Hansen, who has ideas for a world trade center, ideas to fire the imagination of the general public, men who can visualize and paint pictures of achievement. There is a definite need for such a world trade center, and if this area is to grow, it must grow by way of world trade.

It is natural that San Francisco should lead this whole area in such a move, and cities in Western states should look to San Francisco as their natural export outlet. By the development of a world trade center, a foreign trade zone, and a great airport, the cities of the Bay area and on back to the cities of the mountain states will be attracted to us, and the embryo exporters will turn to our Chambers of Commerce and our import-export houses for a helping hand.

Currently post-war planning committees are making plans for the future. There must be someone to act upon these plans and to follow through. It is natural to look to San Francisco as the leader in world trade. You have the import-export houses, the banking facilities and allied lines. Shall Oakland, Berkeley and Richmond go it alone in the handling and developing of world trade? Shall the East Bay exporters require that the banks establish foreign exchange departments in the East Bay with duplication of facilities? In an overall program of this kind, the East Bay has something to contribute. Oakland has an extremely active post-war foreign trade committee and has a 14-point program which it hopes to put into ef-

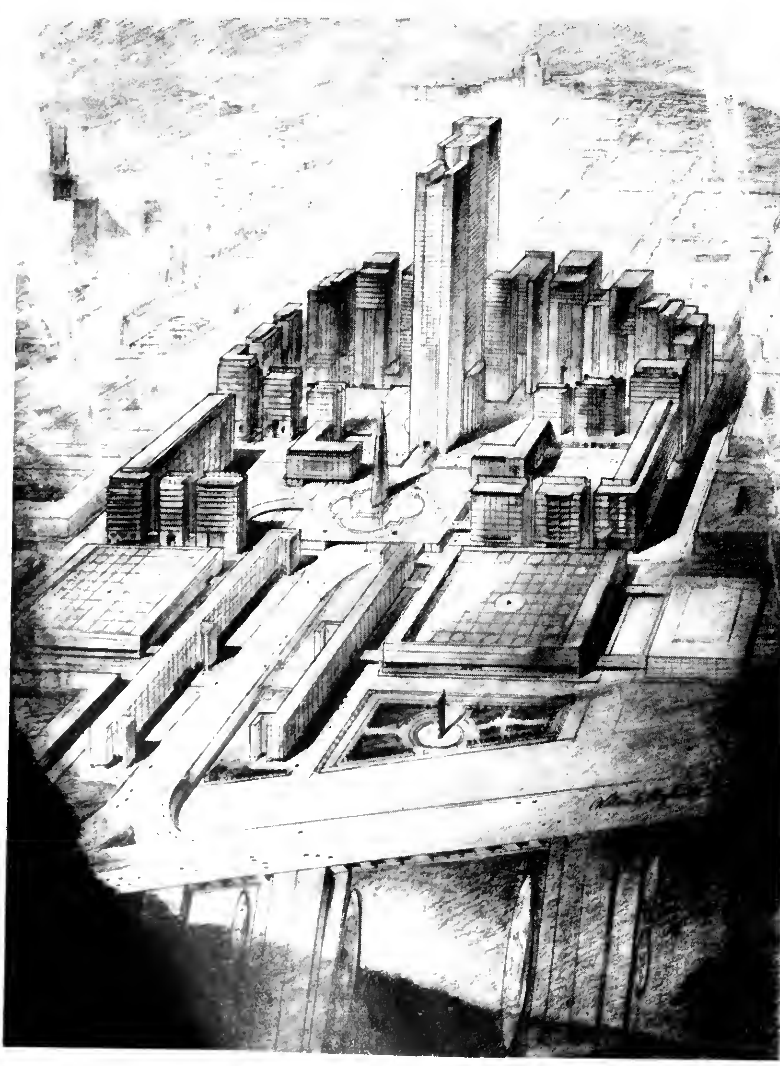
Pacific WORLD TRADE

fect. This deals with import-export facilities, educational programs, market analyses, clinics, etc. Berkeley, Richmond and Oakland are growing. Just how well acquainted are we all with the East Bay? What do we know of its industries? Over there are leaders of national importance in the food canning industry, cereal manufacture, glass manufacture, calculating machines, drugs, paints, roofings, linoleums, chemicals, insecticides, and of course shipbuilding. And don't overlook the educational facilities, which are very important to world trade development. As we approach the post-war period we want to hold the gains we have made and expand our volume by extending our world trade. We want to do this "hands around the bay." Let's make our efforts Bay-region-wide. Why shouldn't we work as a unit from San Jose to Richmond? Will San Francisco lead such a movement?

Industry, Labor and Agriculture

Let's stir the imagination of the heads of industry, of labor, and of agriculture. There should be trade promotion conferences, a complete well-indexed record of all importers, exporters and export agencies in the area. There should be an organized plan of acquainting ourselves with the needs of other countries and how they wish to carry on business. We need a staff of experienced trade advisers. Let's put on sample fairs such as have been held successfully for years in Europe (Brussels—Leipzig); in short, there should be mobilized know-how, an organization to which anyone in this area or in the back country might turn for assistance in developing an import-export business. We should work for a unified front of all manufacturers and businessmen, of labor, bankers and export houses. We must remember also that in order to sell we must buy. There is a very definite place for the export house in representing many small manufacturers.

Proposed World Trade Center in downtown San Francisco.



Yes, we are confident that we are going to have private enterprise in the post-war future, but we are not going back to the "good old days." We want to have a part in formulating the new national policy which will govern world trade. We want to have a unified West Coast influence on the development of multilateral trade agreements, unified communication system, air transport policies, steamship line routings, stabilized exchange, trade financing plans, and on the relaxation of Government control. This can be accomplished if we will organize this area and then will develop an organization in the eleven Western states known, perhaps, as the Western States World Trade Council, which will give us very strong legislative pressure.

Now Is the Time

Right now, before the war ends, it is time to stir ourselves if we want a part in determining the course of post-war trade, if we want to get in on the trade of the Pacific, with Latin America, and with Russia in a big way.

We can start by selling the world trade theme to our own Board of Directors, to our staffs, to our own industries, and to our communities. Can you believe that some export departments exist by sufferance only, and then only so long as they don't interfere with the carrying on of domestic business? In some organizations domestic trade gets first call on production at all times. Sell your organization on the fact that world trade offers an opportunity to **expand.** Get your company to pledge a sum of money for the development of foreign trade and to reserve a part of the monthly production to serve this field. The responsibility for this new development is ours, it is not the responsibility of the Chamber of Commerce or of your bankers.

We have a great opportunity. Let's go to meet it.

Pacific WORLD TRADE

Insurance, Offspring of the Shipping Industry

No doubt it would have been thought of in some other connection in due time, but insurance had a history of perhaps a thousand years in relation to shipping before it ever was applied to fire, life, accident, theft, frost or hail, plate glass, or any of the multitude of other losses now underwritten by the great insurance industry.

When the ancient businessman or trader shipped his goods to another country, two important perils might prevent his goods from reaching their destination. The first was pirates. Ships were heavily armed, or else traveled in company of other ships that were armed. This gave some protection against the robbers of the sea, but storms and other perils of the sea were another matter.

When a ship began to sink because of heavy waves, overloading, or gunfire, the ship was often saved by throwing overboard a part of the cargo, thus lightening her and keeping her afloat. The only trouble with this good idea was—whose goods were to be thrown overboard? The merchants aboard argued and fought and often the ship went down. So a simple technique was used. It made no difference whose goods were thrown overboard. The loss was made up by contributions from the owners of the goods saved by the sacrifice. This was really an insurance device—primarily a device for the limited distributing of loss. Thus originated general average.

The financing of the shipment came in for treatment of a somewhat analogous nature. It became possible for the merchant at home to borrow money in rather peculiar manner. Charging a high rate of interest, the lender would expect repayment only if the ship arrived safely. If it failed to arrive, the loan was canceled. Thus the shipper secured immunity from loss, and the lender received a high rate of interest to compensate for the losses he had to take on some shipments, thus distributing the loss to all. This was primitive insurance.

The idea that insurance was connected with the sea was common up to as late as the sixteenth century, when a dictionary said, "Insurance is a contract by which one promises indemnity for things that are transported from one country to another, especially by the sea."

Whenever insurance is mentioned, the name "Lloyd's" comes to mind. Edward Lloyd kept a coffee house on Tower Street in London. Toward the end of the seventeenth century it was a popular place for seafaring men and merchants to gather and to discuss their affairs, not the least important of which was the problem of how to avoid loss at sea. Here again the idea of distributing the losses became the practical solution. A merchant would take a slip of paper, write on it the name of the ship, its cargo, destination, crew, and some other details, and pass it around so that anyone who wished to become an insurer of the venture would sign his name at the bottom, with the amount he was willing to risk. When the amounts added up to the necessary total, the contract was completed. The men who signed the slip were called "underwriters"—a word that is still one of the most commonly-used words in the insurance and shipping business. From this humble beginning, Lloyd's grew to be the vast and important institution it is today. And its link with the sea is as close as ever. In 1940 Ocean Marine insurance premiums in California alone totaled $12,585,063.

"Fortune" Poll on Foreign Trade

The May issue of "Fortune" gives the results of a poll of executives and management on the future of Foreign Trade as affecting their businesses.

Of those questioned, 59.1 said they would benefit from Foreign Trade, 67.7 said Foreign Trade will be good if there is an international organ, while 30.9 said Foreign Trade will be good regardless of any international organization. 60% expected their largest trade to be with South America, while 33.7% picked Asia.

Bank of China to Open San Francisco Branch

The Bank of China will establish a San Francisco branch in the near future, as well as one to be opened in Havana. At present the only branch of the Bank of China in America is located in New York City. This is managed by Pinfang Hsia.

Bay Region Organized

The Bay Region Foreign Trade Promotion Committee is now meeting regularly with the Chambers of Commerce of Alameda, Berkeley, Oakland, Richmond, San Jose, San Francisco and Sunnyvale, the Foreign Trade Association of San Francisco and the Oakland Foreign Trade and Harbor Club participating.

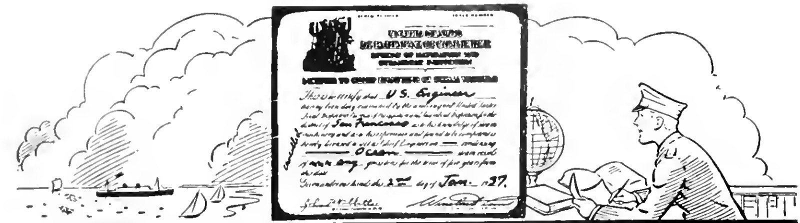
Proposals now under consideration are:

(1) Preparation of a Bay region index or directory of manufacturers and their products; of foreign trade houses — import and export — and their facilities for distribution of Bay region (and interior) imports and exports; of transportation companies (steamship, rail, air, truck); of custom house brokers, freight forwarders; of marine insurance companies; foreign departments of banks; of cargo surveyors; of terminal and warehouse agencies; of admiralty and customs attorneys; of foreign consulates general and consulates and other elements embraced by the foreign trade fraternity.

(2) Holding a foreign trade conference to instruct manufacturers not heretofore participating in foreign trade in the technique, procedures and "know-how" of exporting and importing. Each manufacturer would be requested to assign one of the staff to participate as a "student" in the Conference series.

(3) Operation as a one-for-all agency in behalf of all Bay region chambers of commerce and foreign trade organization **one Bay Region World Trade Department.** Each community's foreign trade interest would enjoy proper attention and at the same time there would be avoided overlapping of effort.

Phil A. Hoyt and William L. Montgomery were on May 4 elected temporary chairman and secretary, respectively, of the Bay Region Foreign Trade Promotion Committee.



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California

ELECTRIC DRIVE TANKERS

Auxiliary Generators

The generator unit consists of a 400-kw alternating-current generator, a 75-kw direct-current generator and a 55-kw direct-current exciter.

The 400-kw generator shaft has a solid coupling flange for connection to the reduction gear coupling flange, and is supported on this end by the adjacent reducing gear bearing. The outboard end is supported by a pedestal bearing.

The 75-kw and 55-kw exciters are combined into a single unit, as shown in Fig. 26. The rotor shaft of this unit is coupled to the shaft of the a-c generator. The outboard or exciter end of this shaft is supported by a pedestal bearing.

Rating and Classification Data For 400-kw Generator

Kilowatts	400
Volts	450
Power factor	0.8
Amperes at rated p-f continuous	642
Revolutions per minute	1200
Degree of enclosure	Drip proof
Ambient temperature of reference	50 deg.
Frequency of phases	60 cycles, 3 phase
Number of poles	6
Air gap	.175″ min.
Size of brush	1⅞″ x ½″ x 1″
A-c Generator Stator Winding—	
No. of slots	90
Coils per slot	1
Turns per coil	3
Pitch of winding	(1-14) 86.6 per cent
Conductors	2 (.250 x .110) d-c
Total weight of copper wire of one machine (stator)	344 lb.
Resistance line to line at 25 C	.00476 ohm
Connection	6 circuits Y

Rating and Classification Data For 75-kw Exciter

Kw	75
Volts	110
Amperes	682

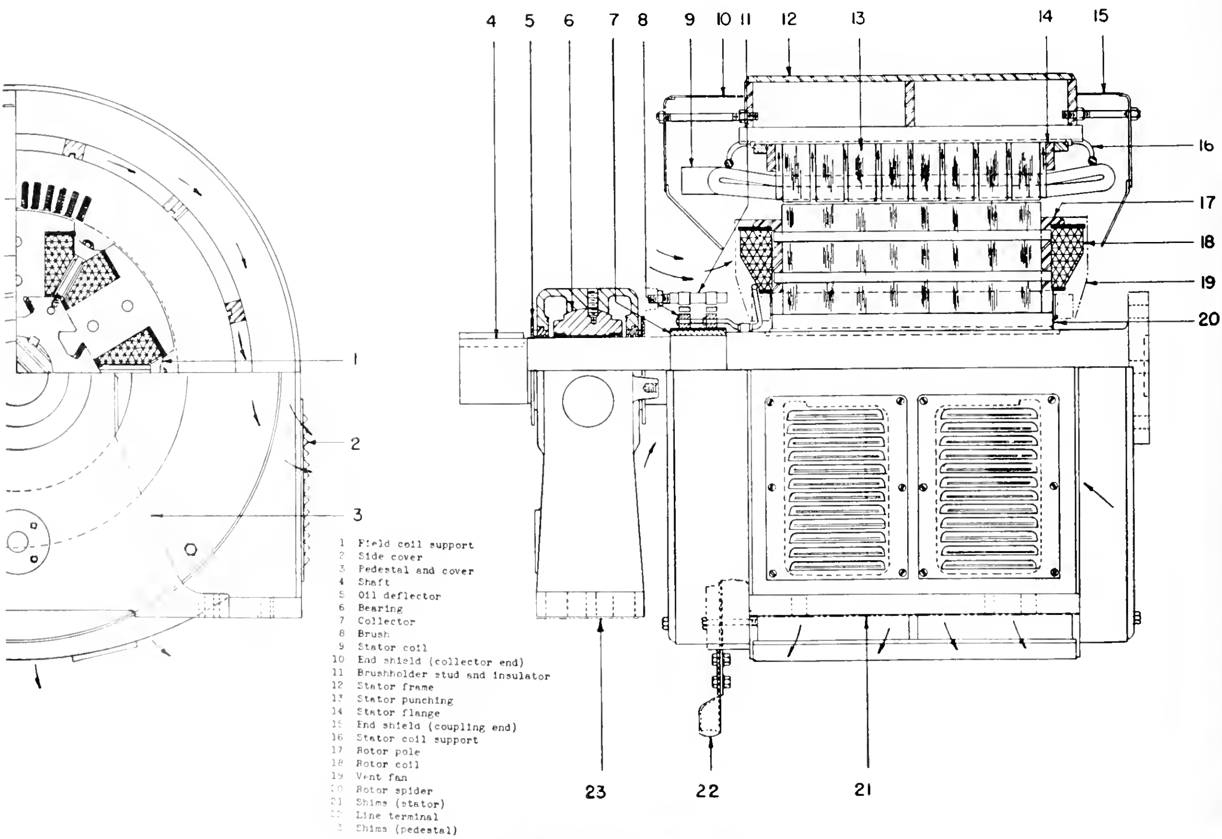


Fig. 25: Assembly of a-c generator (525-kw set).

Rpm 1200
Degree of enclosure..........Drip proof
Method of cooling.........................Fan
Ambient temperature of
reference .... 50 C
Type of winding........................Shunt
Shunt field resistance (at 25 C)
.... 4.55 ohms
Commutating field resistance (at
25 C) .... .00165
Number of poles.............................. 6
Air gap, main pole (average)
.... .160 in.
Air gap, commutating pole
(average) .... .235 in.
Size of brush.......... 2″ x 1¼″ x ⅞″
D-c Armature Winding—
Number of slots............................ 69
Coils per slot.................................. 3
Turns per coil.................................. 1
Pitch of winding............................. 11
Conductors.......... 2 (.070″ x .300″)
Total weight of cu. wire/mach.
(armature) .... 132.5 lb.
Resistance (at 25 C).............. .00425

Rating and Classification Data For 55-kw Exciter

Kw 55
Volts 120
Amperes 458
Rpm 1200
Degree of enclosure..........Drip proof
Method of cooling.........................Fan
Ambient temperature of
reference................................ 50 C
Type of winding..............Compound
Shunt field resistance (at 25 C)
.... 18.3 ohms
Series field resistance (at 25 C)
.... .00051 ohm
Commutating field resistance (at
25 C).......................... .00182 ohm
Number of poles............................ 6
Air gap, main pole (average)
.... .134 in.
Air gap, commutating pole
(average) .... .175 in.
Size of brush.......... 2″ x 1¼″ x ⅞″
D-c Armature Winding—
Number of slots........................... 67
Coils per slot................................ 1
Turns per coil................................ 1
Pitch of winding........................... 11
Conductors.......... 4 (.095″ x .230″)
Total weight of cu. wire/mach.
(armature)........................ 59.5 lb.
Resistance (at 25 C)........ .0045 ohm

Installation

Installation of the machine should provide protection from moisture, escaping steam, drip from pipes, dust, dirt, lint, or any other injurious substances. Room should be allowed about the generators for cleaning and

(Page 93, please)

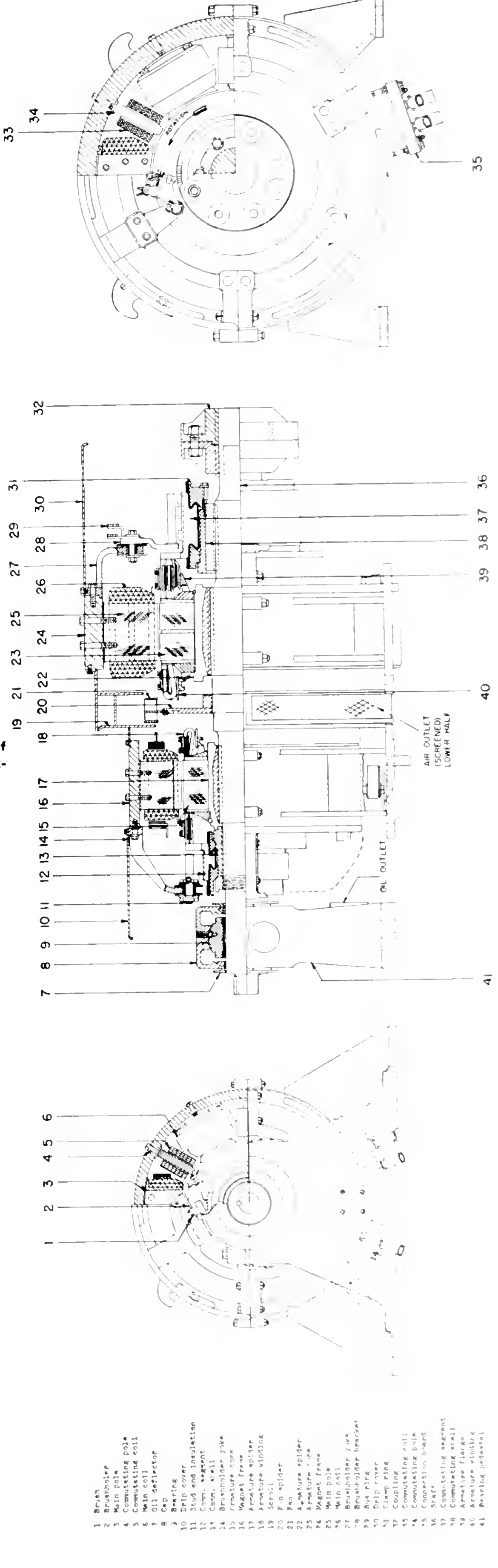
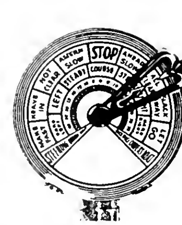


Fig. 26: Assembly of d-c generator and exciter (525-kw set).

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

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POST-WAR SHIPPING

Every officer in the American Merchant Marine should be deeply interested in and soberly thinking about the post-war use of America's tremendous fleet of merchant ships. There are many plans on paper covering this subject, but the plans of the governing bodies are the most significant. The most potent leader in these bodies is Rear Admiral Emory S. Land, chairman of the U. S. Maritime Commission and of the U. S. War Shipping Administration. Here are a few of the admiral's ideas on this subject:

"No one knows how many ships we can maintain in profitable post-war service. Two obvious post-war economic phases are involved; one, the period of transition from war to peace; two, the era of resumption of normal world trade conditions. In the transition we will be called upon to play a leading part in the rehabilitation and restoration of much of the rest of the world. This will mean more ships than our Merchant Marine has ever required in peace time.

"Our problem, now that our shipbuilding industry has reached its production peak and is fully capable of meeting its goals, is to continue our merchant marine in the post-war future as a basic resource. If we are to keep our merchant fleet up to full efficiency we must make normal replacements each year. We must not repeat mistakes made in the wake of the last war.

"The suggestion has been made that a sound merchant marine of from 15 to 20 million deadweight tons would fully meet with our mounting economic and security demands.

"Not all of the proposed merchant marine fleet would be engaged in foreign service. Normal peace-time requirements incident to domestic transportation necessities alone would absorb no inconsiderable volume of the proposed tonnage. Ships in this category are always the first to be utilized in case of national emergency.

"Great Lakes shipping would have a peace-time requirement of approximately 3,500,000 deadweight tons; our great rivers now have about 6000 miles of navigable water and would need about 2,500,000 tons of shipping; while 3,800,000 deadweight tons of shipping could be used in coastal and intercoastal transportation, leaving about 7,500,000 tons more or less to be used in foreign shipping, certainly not an alarming proportion. During a normal peace-time year, less than 4 million deadweight tons of American shipping were engaged in foreign trade. Is it impractical to say this would be increased approximately 50 per cent in the post-war years? Our own domestic shipping requirements will never impinge upon our relations with other nations.

"The future of the merchant marine will be subject to international policies and adjustments. Ships which go abroad are instruments of foreign policy and must be treated as such. The United States has no desire to thwart the legitimate operations of other nations at sea. Shipping is more important to some nations than to others. We, for example, have learned by experience that a sizable merchant marine, backed by a healthy and virile shipbuilding industry, is essential to our economic life and national security. We try to understand the necessities and urgent needs of our friends in other lands—and I think we have earned the right to expect that they will do the same for us.

"There should be a mutual appreciation for each other's needs and some frank and friendly collaboration. This happens to be one of those things which everyone favors in principle, but few support in practice. In other words, everybody wants to cut the pie but no one wants to take a small piece. There are only so many pieces in the pie. The only alternative to taking smaller pieces than we would like to have is to increase the size of the pie. We have not scratched the surface of our foreign trade potential. I recommend that we bake a bigger pie. American industry has a great productive capacity for making things the world will need; it can provide much that should be in strong demand for many years by other nations.

"Our schedule for 1944 calls for approximately 1700 merchant ships, at least half of which will be fast ships that can serve most effectively and economically in the post-war world. We will need more of these ships if we subscribe to the practical theory that this nation cannot survive and prosper without an adequate merchant marine and the facilities and personnel to build and repair our ships. We cannot meet our world-wide obligations, particularly those we are incurring during this war, without sufficient ships—fast, efficient, modern ships—in operation under our flag, and under private ownership and operation.

"In resuming normal trade relations with other nations, we may well profit by the example set by our great merchandising establishments in expanding and developing their trade. The progressive grocer, baker and brewer have proved an efficient delivery system of their own—an adeqate fleet of trucks—to be a prime essential in building their business and expanding it. If we, as a great industrial and agricultural nation, support a merchant marine which

can render that type of service to other nations, it stands to reason we can profit from the service we render.

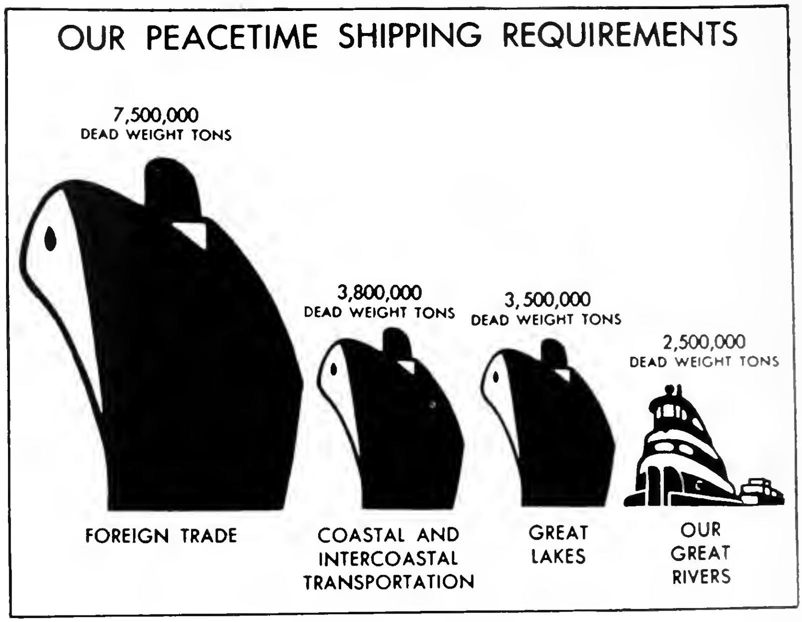
"The expansion and stability of our merchant marine and the maintenance of a substantial share of our vast and highly efficient shipbuilding industry will be, in large part, dependent upon the measure of support given by the American people. It is regrettable that for many years neither the Government nor the shipping industry made any intelligent, intensified effort to win support for our ships. It is time we did so.

"It took the tragedy of a global war to bring home to America the importance of ships and a shipbuilding industry in being, ready to produce ships in a hurry and when an emergency exists. We must not forget this lesson. We need a broader and more sympathetic public understanding that ships and shipbuilding have strong and essential importance in peace time. I want America to be deeply and acutely conscious of these things.

"We can never be too ship-minded."

These are the words of a sailor, not those of a politician, and it occurs to us that you, the officers of the American Merchant Marine, are better qualified than any other group of citizens to spread this gospel of ship-mindedness.

What do you think of post-war shipping? Have you any plans that you think would be helpful?



(From March issue of "Ships.")

New Wage Scales

After a determination by the National War Labor Board, the War Shipping Administration announced on May 17 that new nation-wide stabilized wage scales and working conditions had been set for licensed deck and engineer officers on dry cargo vessels operated by WSA.

The new wages and working conditions, effective on June 1, end the wide disparities in pay for officers of equal rank on identical ships, WSA said. These differences had been greater than in any other industry, wages varying as much as $80 per month. The new scales and working rules tend to approximate the average wages and conditions for the industry.

The new rates set standard pay and working conditions on vessels of the same power-tonnage class, whether sailing from Pacific, Gulf, or Atlantic Coast ports. Thus the new rates stabilize wages and conditions for merchant officers.

As an example, the new rates for a Liberty type steamer are:

Mate or Engineer	Per Month
1st	$254
2nd	220
3rd	202
4th	185

These wages do not include war risk, overtime, or other payments. Eleven ship's articles signed after June 1 will carry the new rates.

YOUR PROBLEMS ANSWERED

(Continued from page 91)

inspection, and the location should permit effective ventilation and a uniformly cool temperature.

Windings should be protected during assembly to prevent mechanical injury, and to prevent metal chips' falling between the coils.

The generators should be handled carefully to prevent damage to the windings and other parts. The proper method of supporting the rotors is by slings, or by blocking under the shafts, or by a padded cradle under the core laminations. Do not lift the armatures with slings around the commutator or collector. Bearing journals should be protected to prevent marring the polished surfaces. Do not allow the weight of the rotor or stator to rest on the base without substantial support directly under the points where the weight comes. Lifting lugs are provided for the frames.

Moisture in electric machines affects the insulation resistance of the windings, and should be removed before the machine is placed in operation. It is usually found that machines which have not been exposed to rain or unusual dampness will not require drying out.

Operation

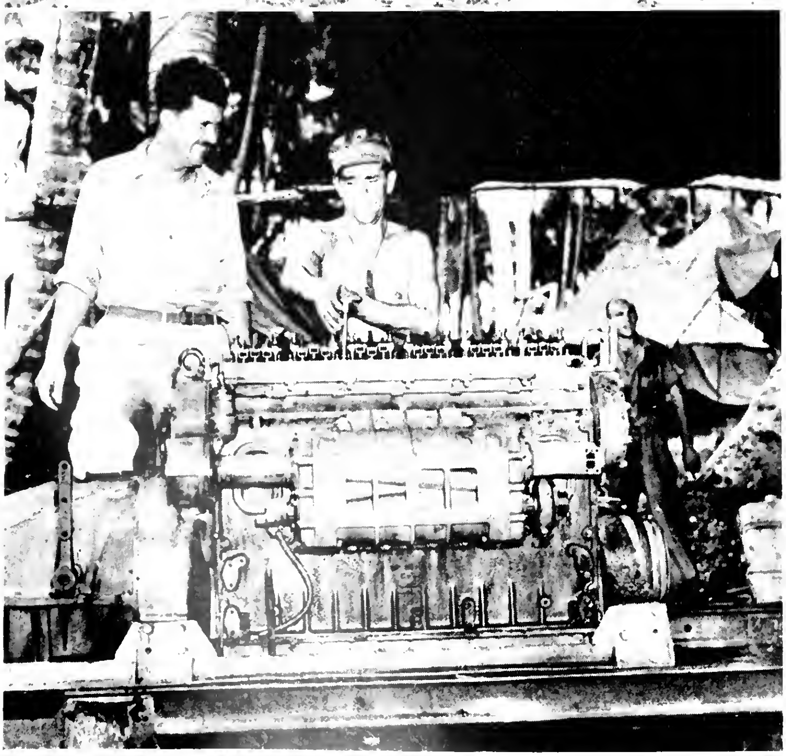
The machine should be inspected before being placed in operation to determine whether the exciter commutator requires polishing. If a machine has been shipped with the commutator freshly turned, it is necessary to operate the machine under light load for about 24 hours and then for an additional 24 hours under approximately half load. The commutator surface should then present a high and uniform polish. A machine may be loaded at once if it is shipped with the commutator polished from factory testing.

No lubricants of any kind should ever be applied to a commutator. The brushes are self-lubricating and may leave a black deposit on the commutator when first placed in service; this deposit should be wiped off as rapidly as it appears, with a piece of dry canvas or other hard non-linting mate-

(Page 101, please)

In Today and Out Tomorrow

By C. W. Patterson



The title of this article is the order of the day for diesel landing craft engines now being serviced in the South Pacific by the Boat Maintenance Company of the Amphibian Engineers Brigade. The author has just returned from 22 months' service in Australia, the Solomons and New Guinea with the Amphibian Engineers, working as "trouble-shooter" for the various models of the 71 Series diesel engine, which, with one other type of General Motors diesel engine, are powering America's landing craft.

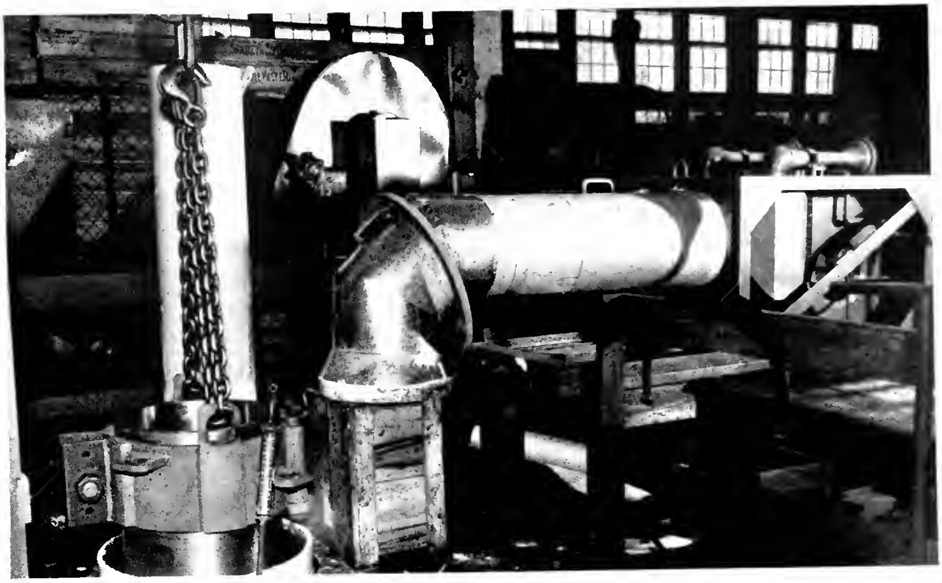
With amphibian warfare becoming increasingly important in the Pacific, it is vital that landing craft coming in for power plant repairs be in shape to return to active duty in an absolute minimum of time, usually in less than 24 hours. In order to accomplish this, it has been necessary to set up "on-the-spot" jungle service stations, often constructed out of coconut tree stumps, inverted railroad irons, and whatever the Japs may have left when they were cleared out by the advance of our armed forces.

Minor engine repairs are made right in the landing craft. In cases of major repairs, a perfect engine from a limited bank replaces the damaged engine, which is then overhauled, tested and put in the bank as a future replacement. Many times fine technical skill has to be combined with Yankee ingenuity. Check valves, for example, have been made from hose clamps, while filter elements are occasionally fashioned out of socks filled with waste.

The simplicity of design of the diesel engine plus interchangeability of parts have aided the Amphibian Engineers greatly in performing some of their service miracles in revitalizing landing craft engines thought to be permanently damaged. To my knowledge, no diesel engine in landing craft in the Pacific war area has ever let 'em down under fire.

Above: New Guinea service station. Members of the Boat Maintenance Company of the Amphibian Engineers repair damaged 71 Series General Motors diesel landing craft engines in this South Pacific service station, fashioned out of coconut tree stumps and railroad irons. At the left are Capt. R. W. Loos, Commanding Officer of the Engineers, and C. W. Patterson, service representative of the Detroit Diesel Engine Division of General Motors.

Below: Mr. Patterson (left) checks final repairs on damaged engine in an emergency New Guinea service station. T/4 Robert Button installs cylinder head.



Bronze liner being lowered into vertical heating chamber as first step in process by which it will be shrunk on tail shaft. Bracket spacer at bottom of chamber assures correct placement of liner. Thermometer beside liner checks heat at top of cylinder. Others check at center and bottom. Pipe at right leads from upper furnace.

Vertical Oven Speeds Production

After tail shafts are finished, bronze surface liners must be shrunk on to form the stern bearing journals. The tubular liners used on shafts, which Joshua Hendy Iron Works is supplying to the Maritime Commission, are 12 feet 8⅞ inches long, 19 15/16 inches in outside diameter, and 1 1/32 inch thick. They cost around $2500 each and cannot be salvaged if they have been improperly set on the shaft. Hendy engineers devised special equipment to do this job, which has proved highly satisfactory in operation.

This equipment makes it possible to finish the job in from 1½ to 1¾ hours, and freezing of the liners in their proper position is assured.

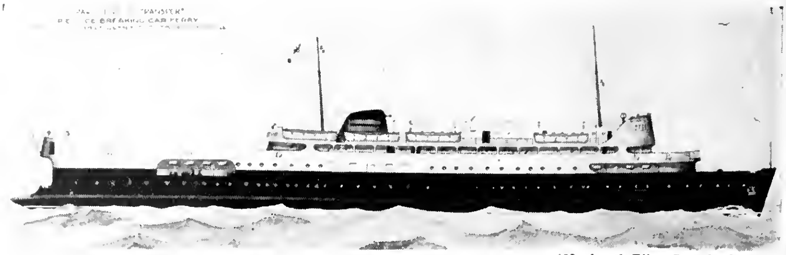
A vertical heating chamber, constructed to accommodate the entire 19-foot 4⅛-inch length of the shaft, exclusive of the flange, was constructed below the floor level of the shop. It is metal-lined and insulated. When the bronze liner has been put in position in the chamber and checked for accuracy of placement, two electric hot-air furnaces go into operation. One, at the bottom of the chamber, heats the outside of the liner. The other, moving on tracks at the floor level, connects with the chamber by means of a tight cap and directs superheated air to the inside of the cylinder. Thus perfect uniformity of heat is assured. Three thermometers report on temperatures at the bottom, center and top of the chamber.

When two set micrometers at the top of the liner show that it has expanded sufficiently, the upper furnace is disconnected and rolled away on its tracks, while the lower furnace continues to heat the outside surface, keeping the expansion of the tube at a constant point. The cold shaft, equipped with a special spacer to insure correct position of the liner, is then lowered into place, and the lower furnace is turned off. Since the installation has permitted perfect control of temperatures, the liner has been expanded to the minimum necessary for the easy insertion of the shaft, and the shrinking process is quick and uniform, with no chance for distortion or premature freezing. All handling is done by crane, with special clamps to hold the liner and shaft, thus adding a special safety factor.

Upper: Liner has shrunk into place and crane lifts out tail shaft. Note special spacer at top by which correct position of shaft is assured.

Lower: Completed tail shaft with liner is lifted clear of chamber to be removed for machining. Entire process has taken only about an hour and a half, and spoilage is practically impossible.

A Canadian Ice-Breaking Car Ferry



(National Film Board photo)

Marine Industries Limited of Sorel, P. Q., have been awarded contract for the construction of a new ice-breaking car ferry to operate between Port Borden, P. E. I., and Cape Tormentine, N. B. The keel for the new vessel has already been laid. The ferry will carry railway passenger and freight cars, automobiles and buses, as well as passengers. This ferry is interesting because of the diesel-electric drive and because it is claimed to be the finest craft of its kind in service in any waters. The contract calls for completion and delivery of the vessel before the winter of 1945, and the estimated cost is $4,750,000. The ferry will be operated by the Canadian National Railways.

Design plans were made by Messrs. German and Milne, naval architects and marine surveyors, Montreal. This ferry will be notable for its outstanding appearance as well as its serviceability. Its engines will be more powerful than any other craft of its kind, generating 12,000 bhp. In the construction of the vessel all the latest advances in shipbuilding and marine engineering will be incorporated, combined with special features to meet year-round service problems in Northumberland Strait. The vessel will withstand the most severe ice conditions and will be able to operate through field ice as well as packed ice. Iceworthiness is considered to be of prime importance in its construction.

The hull is of mild steel all-welded construction built to the requirements of the British Register of Shipping and Aircraft and to their special survey for ice-breakers, and conforms in its equipment and outfitting to the rules of the Canadian Board of Steamship Inspection. Principal characteristics are shown in the table herewith.

Propulsion Machinery

Eight powerful Sulzer diesel engines are direct connected to electric generators, and will operate four sets of propelling motors each connected to a separate propeller—two forward and two aft.

Remote control of the propelling motors from the bridge provides for instantaneous response to the orders of the navigating officer through conveniently located control levers. The utmost precision of control is possible. An infinite number of speed changes will be available and it will be possible to apply power to a choice of propellers. Ample safety devices will be provided for any emergency condition of operation.

The diesel engines will be manufactured by the Dominion Engineering Co. Ltd., Montreal, and the electrical equipment for the vessel will be constructed by the Canadian General Electric Co. Ltd., in their plant at Peterboro, Ontario. About 95 per cent of the materials of construction are of Canadian manufacture.

Accommodation has been designed to afford the maximum comfort to passengers, and will include lounges, smoking rooms, rest rooms, and restaurant, equipped with every convenience. Seating accommodation in the public rooms will provide for the comfort of 250 passengers, while life-saving appliances will be provided for a total of 950 persons. Emergency sleeping quarters for 100 passengers will be provided.

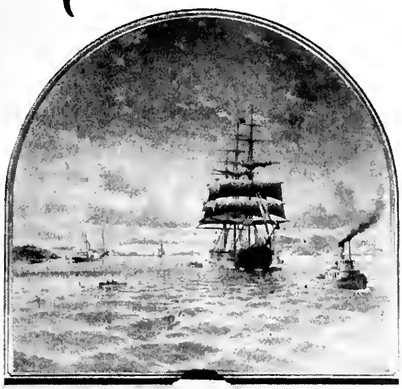
The new vessel will have five decks: lower deck, main or railway car deck, mezzanine, automobile and boat decks. All navigating appliances aboard will be the most modern available, and every precaution is being taken to make the vessel fireproof and to provide the utmost margin of safety against casualty.

Principal Characteristics

Statistics of the new quadruple screw ice-breaking railway car ferry, with comparative figures for the former S. S. Charlottetown and the S. S. Prince Edward Island, operated on same route.

	New Ferry	Charlottetown	Prince Edward Island
Length overall	372′ 6″	324′	300′
Length B. P.	348′	310′	285′
Beam molded	61′	59′	52′
Depth molded	24′ 9″	25′	24′
Draft extreme	19′	19′ 3″	19′ 6″
Tonnage, gross	7000	5889	2795
Tonnage, net	4500	3385	1100
Railway car tracks	3	3	2
Railway cars carried	19	16	12
Automobiles carried	60	41	40
Passengers	950	800	750
Restaurant	200 per hour	100 per hour	capacity 27
Engines	8 sets Sulzer diesel-electric	3 sets 26-41-66x36	3 sets (2) 23½-37½-60x39 (1) 21-33½-54x36
Horsepower	12,000 bhp	8000 ihp	7000 ihp
Speed, approximate	16½ knots	14 knots	12½ knots

Marine Exchange NEWS of the MONTH



By M. A. Cremer, Manager

There have been added during the past few weeks to the roster of members of the Marine Exchange the following: Owesen & Co., Basalt Rock Co., The Young Co., Ocean Marine Industries Corp., Pacific Mail S. S. Co., Capt. George Harris and the Electro Protective Corp.

Merchant Mariner Medals Awarded

On National Maritime Day, May 22, at colorful ceremonies on the Marine Exchange floor, the Merchant Mariner Medal was awarded to the next of kin of eight seamen who went down with their ships.

Before a large gathering at 11:30 a.m., Commander Roy C. Ward, president of the Marine Exchange, introduced Commander Malcolm E. Crossman, Superintendent of the U. S. Maritime Officers' School at Alameda, who presented the medals to those selected to receive them. In some instances the mothers, in some the wives, and in one a young daughter, were given the award.

Shipbuilders' Exhibit

Beginning with National Maritime Day a fine display of the shipbuilder's art was opened on the Marine Exchange floor.

Open to the public, the display during the two weeks it was shown drew a record crowd of thousands. Included in the attendance were students from the maritime schools of the Bay area and many from San Francisco's high schools.

High lighted were shipyard models of Libertys, frigates, coasters, landing craft, a model in transparent plastic, new designs in shipbuilding, and new types of equipment and machinery.

The exhibitors included:

The Marinship yard of Sausalito
The Henry J. Kaiser yards of Richmond
Joslyn and Ryan
J. O. and C. U. Martin
General Electric
L. A. Young Spring & Wire Co.
Western Pipe & Steel Co.
Westinghouse
Victor Equipment
L. & E. Emanuel
Calif. Ration and Equipment Co.
Mangrum, Holbrook & Elkus
Hough & Egbert
Moore Drydock Co.
Neil H. Peterson Co.
Shand and Jurs Co.

Educational Program

With its program before the Propeller Club on Marine Exchange Day, which was broadcast, the Exchange inaugurated a series on broadcasts, all aimed to acquaint the citizens of Northern California, and particularly the Bay area, with the importance of ships and shipping in the economic life of the community. The programs were prepared and staged by A. McKie Donnan of Brisacher, Van Norden & Staff.

The Exchange believes it to be of great importance to cultivate now a popular opinion favorable to the industry. It may become necessary to rally popular support someday in the not too far distant future. The Exchange believes, furthermore, that the success of any future campaign on a national scale will depend on how solidly this community supports its principal industry and to the leadership it provides. The Exchange is also convinced that to achieve a genuine community interest, labor must participate actively and wholeheartedly. The Exchange is fortunate in having in its broad membership five labor unions. In addition to the participation in the broadcasts of two top-flight steamship executives, namely Frazier Bailey, executive vice president of the Matson Navigation Company, and Charles L. Wheeler, executive vice president of the McCormick S. S. Company, two labor officials took part, George F. Anderson, secretary-treasurer of the American Merchant Marine Staff Officers' Association, and Vincent J. Malone, executive secretary of the Pacific Coast Marine Firemen, Watertenders and Wipers Association.

The Exchange hopes that the program it initiated can be continued on a much larger scale using preferred radio time.

Bay Area Maritime Committee

The committee, composed of representatives of the eleven counties of the Bay area, at its last meeting went on record in favor of the Sacramento River Project, a 30-foot ship channel to Sacramento.

William G. Stone, manager of the Transportation and Industrial Department of the Sacramento Chamber of Commerce, pointed out that the Sacramento River was originally the only means of transportation and communication between San Francisco and Sacramento. Subsequently hydraulic mining operations destroyed the river bed and caused periodic damaging floods. The present completion of the Shasta and Keswick Dams on the Sacramento now makes it possible to control the flow of water and end the period channel damaging floods.

The Bay Area Maritime Committee is now undertaking the preparation of a post-war program of area waterway development. This includes to date the straightening of Suisun Slough, the elimination of Horeshoe Bend on the Napa River and the improvement of dredging operations in upper Suisun and San Pablo Bays.

Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

Restored to Service by Balancing Job

A startling example of the results achieved by dynamically and statically balancing a low-pressure turbine aboard a 15,000-ton transport was brought to light recently by the Balance Engineering Company of Oakland, Calif.

The ship was forced to drop from convoy and return to port, due to such excessive vibration that a 3-inch steam line to the low-pressure casing was broken off, and operators standing near the turbine had difficulty keeping on their feet.

During a trial run, after the ship's return to port, it was decided to balance the turbine rotor as a point of beginning to find the trouble. The engineers' decision was based on the fact that if they knew the rotor was in balance they could proceed confidently from this point to eliminate any other vibration that might be involved.

The company was then engaged to balance the low-pressure turbine, and accordingly its equipment and engineers came aboard.

The equipment consists of an Akimoff balancing machine with capacity up to 40 tons. The machine is portable, which simplified taking it into the engine room, where it was set up on the lower turbine casing. The turbine rotor was then let down into the balancer, and the work began.

The actual balancing was under the supervision of Vernon P. Lynn, who formerly had charge of this work for several years at the Mare Island Navy Yard.

The first detail is to determine the critical speed at which the balancing is to be done; this is accomplished by adjusting the weights and springs of the balancer to give the desired resonant frequency. This frequency, or critical speed, is that at which the vibrations in the rotor (caused by unbalance) come into synchronism with the period to which the balancing machine is set. The balancing operation consists in determining the plane and amount of weight causing the unbalance. Adjustable clamp weights show zero reading on a dial indicator when each end of the rotor is in balance. These known planes and weights are then transferred by calculation to the predetermined points on the rotor where permanent weights can be applied. The actual position of the weights depends on the space available, accessibility, and whether original design has provided points of weight application.

The table herewith shows the centrifugal force developed by one ounce of unbalance at different speeds and diameters. As approximately 80 ounces of unbalance on a 60-inch diameter at 2750 rpm existed in this rotor, the force produced amounted to 80 x 391, or 31280 lbs. From these figures it is easy to understand why this unbalance caused the low-pressure turbine to be disabled. Much smaller amounts of unbalance cause

TABLE GIVING THE CENTRIFUGAL FORCE IN POUNDS PRODUCED BY ONE OUNCE OF UNBALANCE FOR DIFFERENT SPEEDS AND DIAMETERS

	Diameter in Inches														
R.P.M.	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62
500	1.3	2.2	3.2	4.0	4.5	5.7	6.6	7.5	8.4	9.3	10.2	11.0	11.9	12.8	13.6
1000	5.3	8.8	12.3	15.9	19.4	23.0	26.5	30.0	33.6	37.1	40.6	44.2	47.7	51.2	54.8
1500	11.9	19.6	27.8	35.6	43.6	51.5	59.5	67.4	75.3	83.2	91.2	99	107	115	122
2000	21.2	35.4	49.5	63.5	77.6	91.8	106	120	134	148	163	175	191	205	219
2500	33.1	55.5	77.5	99.5	122	144	166	188	210	232	254	276	299	321	343
3000	47.7	79.6	111	143	175	207	238	270	302	334	366	398	430	461	493
3500	65.0	109	152	195	238	281	324	368	411	455	497	540	585	628	670
4000	85.0	142	198	255	311	368	425	481	538	595	652	708	765	821	878
4500	107	179	250	322	394	465	535	605	680	750	820	895	965	1038	1110
5000	133	221	309	398	485	575	663	750	840	930	1015	1105	1192	1250	1370
5500	162	270	378	406	595	702	810	920	1025	1132	1240	1350	1458	1565	1685
6000	191	318	445	572	700	826	955	1080	1210	1335	1465	1590	1720	1850	1975
6500	224	374	522	670	820	968	1120	1270	1415	1565	1715	1865	2010	2160	2310
7000	260	433	606	700	955	1125	1300	1470	1650	1820	1995	2165	2340	2510	2690

KEEP POSTED!

The manufacturers of the new equipment announced in this department will be pleased to furnish complete details without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment as reviewed in your

....issue.

....

....

....

(Identify by name of manufacturer and machine)

NAME..

BUSINESS...

ADDRESS ....

....

serious vibration, resulting in undue wear and short life of revolving parts.

In the case under discussion, on completion of the balance job, the ship was taken on a trial run and brought slowly up to full speed, so that all speeds could be checked for vibration. No vibration was found (even with the use of a stethoscope) by any of the various officials present. These included experts of A.B.S., the Naval Transportation Service, the steamship company, and the ship's engineers.

Such spectacular results are found only when vibration is due entirely to unbalance, as in this case. However it is axiomatic that, "When vibration occurs, balancing first is most economical, and in a large percentage of cases will eliminate vibration and its destructive results."

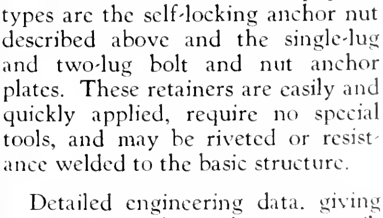
Self-Locking Anchor Nut

The Nutt-Shel Company of Los Angeles, California, announces the marketing of new type, lightweight bolt and nut retainers and self-locking anchor nuts.

The self-locking anchor nut assembly consists of a fiber self-locking device and a nut of selected steel, securely contained in a steel shell. This is easily and quickly applied, and will hold the screw threads securely in their original position under all conditions of stress, vibration and shock. This unit conforms to the Army Air Forces Standard drawing AC 366.

The line comprises both plain and self-locking retainers for any application. Some of the more popular types are the self-locking anchor nut described above and the single-lug and two-lug bolt and nut anchor plates. These retainers are easily and quickly applied, require no special tools, and may be riveted or resistance welded to the basic structure.

Detailed engineering data, giving dimensions and weights, are available at The Nutt-Shel Company, Los Angeles 15, California.



A Tin-Saving Babbitt Metal

The highest grade of babbitt metal used in bearings during normal times had a tin content of around 89 per cent. For many years research laboratories have worked to find satisfactory substitutes for this tin without sacrificing bearing quality. The Bondrat Metal Corporation has been successful in this quest, and has produced in its Bondrat Babbitt Metal an alloy that saves 78 per cent of the tin used in the highest grade tin base babbitts and at the same time assures better performance in certain essential characteristics while preserving equivalent performance in all others.

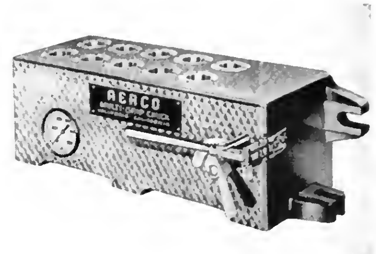
In Bondrat the hard alloy crystals are finely and evenly distributed through a basic plastic formed of tempered lead. This produces a bearing metal of unsurpassed quality with: a Brinell hardness of 30-33; a compression strength of 25,600 psi; an upsetting capacity of 25-30 per cent; a bending strength of 17,000-20,000 psi; a frictional coefficient of 0.003; a shrinkage of approximately 0.55; a solidification point of 464 F; a melting point of 680 F.; and a very high resistance to the corrosive action of organic acids, such as sometimes develop in lubricating oils.

The hardness of Bondrat is better maintained at high temperatures than that of highest tin-base babbitts. At 212° F. it has a Brinell hardness of 16 as compared with only 9 for the highest tin-base babitts. It therefore will better withstand the grinding action developed in the bearings.

This babbitt surpases the best babbitts in its sliding qualities, and experience in working bearings has demonstrated that Bondrat under identical conditions of service will run cooler than the best babbitt metal. It can be used for high pressures and high speed work. Casting takes place in exactly the same manner as has always been used with the best grade tin-base babbitts. It pours easily.

Bondrat was first introduced in this country in early 1942, and has since then seen extended use in practically every type of industry—mines, machine shops, shipyards, on railroads, diesel engines, motor trucks, automobiles and farming machinery.

This superior babbitt metal is being distributed on the Pacific Coast by Moore Machinery Company of San Francisco and Los Angeles.



New Hydraulic Chuck

A new hydraulic multi-grip milling machine chuck is announced by Aerco Corporation, Hollydale, California, with which milling operations can be increased by as much as 500 per cent without the addition of men or other equipment.

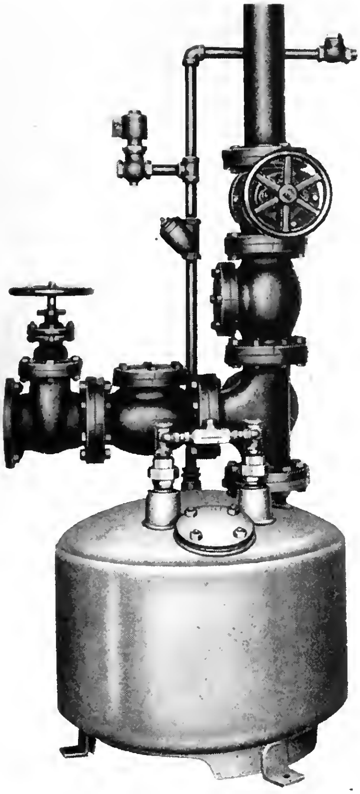
Of simplified design, the new Aerco Multi-Grip Chuck has two rows of five collets. As both rows of parts may be milled simultaneously, ten parts may be milled with one loading. A few strokes of the hydraulic hand pump supplies the necessary pressure for closing all collets simultaneously, building up pressure to as much as 2,500 psi. Work is thus held rigidly in collets and cannot turn or be pulled out during milling operations; however, clamping pressure may be instantly released when desired and the self-opening collets can be quickly reloaded.

Self-centering aligning collets insure perfect on-center milling regardless of slight shank diameter variations. An automatic safety stop prevents damage to collets should all stations not be filled. The collets themselves operate on a double taper—one at each end, which increases the applied pressure far beyond that which is needed for successfully holding the work.

An adjustable depth stop is provided for each collet, which makes it possible for the operator quickly to insert the pieces to be milled at the exact required amount without the use of gages or other methods.

The new chuck comes in two models, and both are compact and self-contained. The pump, valves, pressure gage, depth gage and collet assemblies are all incorporated in the main body of the chuck itself. Model 10 B measures only 14¼" x 4½" x 4½" with a collet capacity of from ⅛" to ½". Model 10 E measures 21" x 6¾" x 6¾". Its collet capacity is from ½" to 1¼".

Round, square and hexagon collets are available for both chuck models.



A New Marine Expelsor

The new Yeomans Marine Expelsor incorporates the principle of the standard Yeomans Expelsor with its long record of efficient performance in municipal and industrial applications.

The pump is of fluid displacement type. Sewage waste collects in a receiver pot and is expelled by pressure.

Pump mechanism consists of a steel receiver pot, hermetically sealed; an inlet discharge pipe which extends to within a few inches of the bottom; a spherical float; two check valves; electrical connections and valves; and the piping necessary to conduct steam or compressed air into the receiver and the waste out of it.

As waste fills the receiver pot it raises the spherical float. This float, lifted to a predetermined level, causes contacts to be energized which operate pressure and exhaust valves. When the pressure valve opens, the steam or compressed air rushes into the receiver to force the contents down and out of the pot through the discharge pipe.

The Expelsor is now ready for the next filling, the float drops, the pressure valve closes, the exhaust valve opens, permitting the escape of the steam or air in the receiver, and sewage flows in. The cycle is repeated. Check valves on inlet and discharge piping operate by pressure to close either line at the proper time in each cycle, permitting inflow and discharge of sewage without any backing up or clogging.

The organization has for many years specialized in pneumatic ejector design; and the Marine Expelsor is a refinement in design based on a principle established by 75 years' successful operation.

Insul-Lite Coatings

In the early days of our present conflict, several Government agencies were seeking a fast method of applying a fire, vermin and condensation-proof insulation to the deckheads and bulkheads of cargo and troop-carrying ships.

After many months of research, technicians of Oceanic Marine Industries Corporation produced Oceanic Insul-Lite, so named because of its insulating qualities and its light weight. It is rat-proof, due to the use of a wire lath foundation, and possesses sufficient elasticity to eliminate hairline cracks.

On the East Coast, this type of troweled insulation has been a boon to the war effort because of the speed of application.

Using an example, a Liberty ship conversion, where the prime contractor must finish his work in five days to make the ship over into a troop transport, it is necessary to provide adequate living quarters for the men; therefore the area that is exposed to inclement weather conditions must be insulated against the varying elements. Hence the use of an approved insulating material such as Fiberglas or mineral wool placed against the areas affected and held there by patented clips which are welded to the ship. Wire lath is then rested against the insulation, then the inboard end of the patented clip is hooked into and bent over the lath. Oceanic Insul-Lite is then troweled into the lath, and the finished product is a glazed surface requiring only one coat of paint. These operations, covering over 10,000 square feet in area, have been completed in less than five days.

The approval of this coating is attested by repeated orders from the Army, the Navy and the Maritime Commission.

A branch service office of the Oceanic Marine Industries Corporation has recently been established at 144 Second Street, San Francisco.

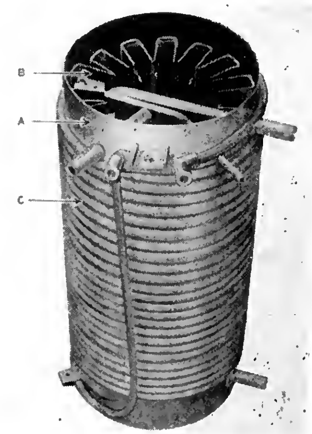
Strata-Flo Water Coolers

Announcement of Strata-Flo water coolers, designed to eliminate warm-up and "wet" systems (water in refrigerant lines), and featuring a simplified method of control, is made by Drayer & Hanson, Inc., manufacturers of heat exchange equipment, Los Angeles, California.

While based on proved cooling principles, these coolers are entirely new in design. The shell of the storage tank "A" is between vertical interior fins "B" and external refrigerant coil "C." Continuous cooling action on the entire body of water in the storage tank is transmitted from the refrigerant coil through the shell to these fins.

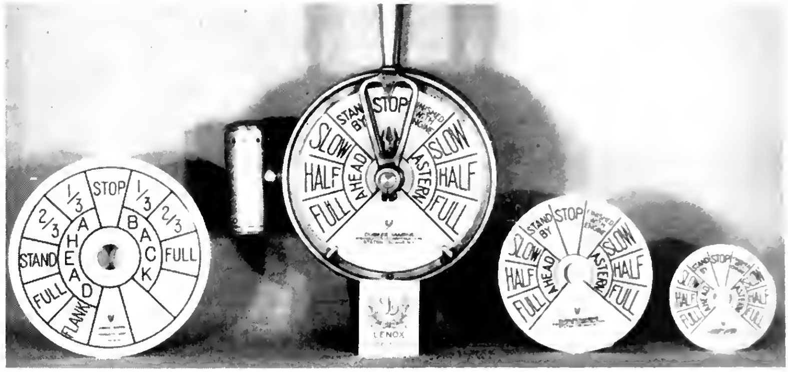
The fins prevent swirling action and confine incoming warm water supply to upper levels, eliminating mixture with water already cooled in the lower portion of the tank and thus reducing warm-up. Since refrigerant can never come in direct contact with water, or vice versa, danger of wet systems is eliminated and control is non-critical. This permits use of the simplest types of controls, consisting of an automatic expansion valve and external adjustable thermostatic switch.

Cabinet models are available in 3½, 7 and 12½ gallon capacities.



Cooling tank diagram of the Strata-Flo water cooler.

China Engine Order Telegraph Dials



It is a long way from the dinner table in the White House to the pilot house of a Liberty ship at sea, but nevertheless the two have something in common that most people don't realize. The exclusive official dinnerware service of the Executive Mansion is Lenox China, and has been since 1918, when President Wilson, after much searching, found that the United States produced a china unsurpassed by any of foreign origin. One of its most noticeable features, other than its beauty of finish, texture and design, is its unbelievable strength despite its high translucency.

Since the beginning of World War II, practically every manufacturer in America has turned his products into doing their part for the Armed Forces. Lenox, Incorporated, has devoted thousands of feet of floor space in its modern factory exclusively to the experimentation and development of vital war material. The Durkee Marine Products Corporation of Staten Island, New York, was searching for an engine order telegraph dial which would be as near perfection as possible. Since its business was founded and is nationally known in marine circles for quality, the company sought the best. G. Chauncey Parsons, chief engineer, who is continually designing and improving ship equipment, was sure there must be a dial that could be developed that would meet the company's exacting demands.

Through the close cooperation of Bolton Holmes and other Lenox executives, and after many tests, a dial was made that was of highest quality and finish and had tremendous strength—being for all practical purposes non-breakable. This dial, in the last two years, has met every test on ships all over the world. The actual body of the dial is made of the same china that was, and still is, the first American-made china to grace the White House table.

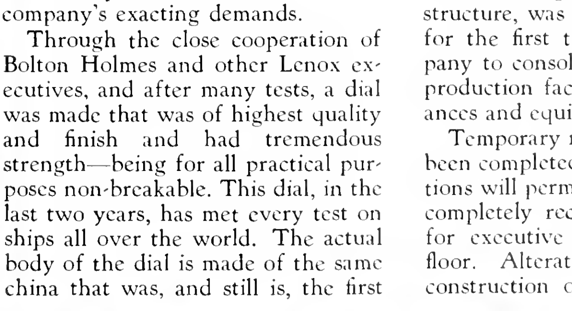
The record of Durkee marine engine order telegraphs using these dials on ships of all kinds speaks for itself.

Little did Walter Scott Lenox dream, 53 years ago when he founded and dedicated his pottery to the finest quality product of its kind, that his contribution would be helping to guide the ships of America to victory in her greatest time of need.

New Home for McDonald Company

Occupying an entire block on South Hoover Street in Los Angeles, the new home of the B. F. McDonald Company provides nearly thirty thousand square feet of floor space for the firm's manufacturing, assembling and executive departments. The building, a modern Class A structure, was recently acquired, and for the first time permits the company to consolidate its assembly and production facilities for safety appliances and equipment under one roof.

Temporary remodeling has already been completed, and as fast as restrictions will permit, the building will be completely reconstructed to provide for executive offices in the second floor. Alterations will include the construction of a large auditorium, complete with stage and projection equipment, where first aid and safety demonstrations will be given by experts in the field. Plans also include the establishment of lunch room and lounges for the personnel of the firm, which now includes nearly 100 employees.



The new building for the B. F. McDonold Company in Los Angeles.

YOUR PROBLEMS ANSWERED

(Continued from page 93)

rial wound around a block and held against the commutator.

It should be determined that the brushes are evenly spaced around the commutator, properly staggered, and bear on the commutator with the correct pressure; that oil is being supplied to the bearings; that proper clearance exists between all moving and stationary parts; and that there are no loose objects, such as bolts, nuts, and tools within the machines, or where they might accidentally drop into the machine.

Collector rings should receive the same care and attention as the commutators. It is especially important when first starting to see that the rings are clean and polished. Failure to do so may result in sparking, rough rings and rapid brush wear.

The source of any appreciable vibration of the machine should be located and corrected. Since all rotating parts are carefully balanced before shipment, it is usually found that any existing vibration is due to misalignment, sprung shafting, or something chafing the rotating element. Brushes sticking in the holders may be the cause of upsetting the balance of the machine. These points should be checked before shifting any balancing weights. Balancing pockets in which lead can be peened are provided in armature flanges for correcting any unbalancing of the armature.

On the Ways —

SHIPS IN THE MAKING

Great Lakes-Gulf U.S.M.C. Merger

On May 15 the Great Lakes Regional Construction Office of the United States Maritime Commission was merged with that of the Gulf Coast Region, and will now be known as the Gulf-Great Lakes Regional Office.

L. R. Sanford, who has been Regional Director of the Gulf Coast Area since that office was first opened, will now direct the shipbuilding activities of both the Great Lakes and Gulf Regions of the Maritime Commission.

The Gulf-Great Lakes Regional Office will continue to be operated at 310 South Michigan Avenue, Chicago 4, Illinois.

W. E. Spofford, former Regional Construction Director in the Great Lakes Area, has been transferred to the Washington Office for research work and other assignments.

Seattle-Tacoma Yards Take Todd Name

John D. Reilly, president of Todd Shipyards Corporation, announces that the name of Seattle-Tacoma Shipbuilding Corporation was changed to Todd Pacific Shipyards Inc., effective on June 1, 1944.

At the same time, he pointed out that the name of Houston Shipbuilding Corporation, Houston, Texas, was changed to Todd Houston Shipbuilding Corporation, effective on May 1.

In addition to four divisions of the corporation, Brooklyn, Hoboken, Seattle, and Combustion Equipment, other subsidiaries and affiliates identified with the Todd name are Todd Galveston Dry Docks, Inc., Todd Mobile Dry Docks, Inc., Todd-Johnson Dry Docks, Inc. (New Orleans), and Todd Oil Burners, Limited (London).

Recent Contracts

Contracts for the construction, at five different shipyards, of 51 cargo vessels of the C-1M-AV1 type were anounced by the Maritime Commission. These ships have a capacity of approximately 5000 deadweight tons.

On May 3 the Commission announced that previous contracts awarded to the Kaiser Company, Inc., of Portland, Ore., for the construction of 60 C1-M-AV1 cargo vessels had been rescinded so that vitally needed tankers could be constructed on the facilities at its Swan Island yard. At the same time, announcement was made that contracts for the construction of nine of these C1-M-AV1 cargo vessels had been awarded to Kaiser Cargo, Inc., at Richmond, Calif.

The present contracts have been awarded to: Consolidated Steel Corporation, Ltd., Wilmington, Calif., 13 vessels; J. A. Jones Construction Co., Brunswick, Ga., 11 vessels; Southeastern Shipbuilding Corporation, Savannah, Ga., 20 vessels; Leathem D. Smith Shipbuilding Co., Sturgeon Bay, Wis., 4 vessels; Kaiser Cargo, Inc., Richmond, Calif., 3 vessels.

These contracts provide for completion of the last of these vessels by the end of April, 1945, and, in the case of the two Georgia yards, will make use of facilities where Liberty ship construction will be tapering off with the end of the year.

GENERAL ELECTRIC HONORED

Below: Mission San Gabriel, 26th "Mission" class tanker launched at Marinship, breaks free as Mrs. Ralph Meyers, wife of General Electric's installation advisor at the yard, breaks the traditional champagne bottle over the bow. Mrs. Meyers officially represented General Electric at the launching, which was dedicated to the manufacturing concern for its fine performance in providing 10,000-hp main propulsion units for these T-2 tankers. Shown are Mrs. J. H. Baylor, matron of honor and wife of a G. E. official at Pearl Harbor; Lt. (jg) Harry M. Philpott, Chaplain; Keith Fullenwider, master of ceremonies and Marinship's chief marine electrician; Mrs. Meyers; and Russell Fox, launching engineer.

Left: Traditional bow decoration on the Mission San Gabriel honors G. E.

(Photos courtesy Marinship)

April Record of the Merchant Fleet

The Maritime Commission recently announced that a considerable change in the trend of its construction program was taking place when ten of the 154 ships delivered during April were of the fast new Victory cargo type. The swing to fast ships is proceeding as rapidly as possible, and it is anticipated that a ratio of 11 fast type to eight of slower type will make up the 1944 tonnage.

Delivery of 154 vessels, totaling 1,593,691 deadweight tons, brings the year's total to 564 ships, with a total of 5,709,642 deadweight tons put into service in the first four months of 1944. This exceeds the first four months of the banner shipbuilding year of 1943, which saw 536 ships of 5,360,712 deadweight tons delivered.

A drop from 83 Liberty ships delivered in March to 79 in April is further evidence of the change to speedier types of vessels.

Twenty standard C-type vessels and 17 standard large tankers delivered in April are part of the Commission's long-range construction program. Also delivered were five coastal cargo ships, one concrete cargo vessel, five concrete barges, one coastal tanker, and one seagoing tug.

West Coast shipyards delivered 62 of the 154 ships, while the East Coast put 55 into service. Gulf Coast shipyards delivered 36 and the Great Lakes area delivered one.

Yards on the West Coast built 639,823 deadweight tons, which was 40.1 per cent of the total tonnage for the month of April. There were 606,511 deadweight tons built in Eastern yards, or 38.1 per cent. Gulf Coast yards produced 346,357 deadweight tons, or 21.7 per cent, while the 1000 deadweight tons produced in the Great Lakes area was 0.1 per cent of the total tonnage.

The number and types of vessels built by all yards during April follows:

Shipyard	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co.	3	Tankers
Avondale Marine Ways, Inc., Westwego, La.	1	Coastal Cargo
Barrett & Hilp	1	Concrete Barge
Bethlehem-Fairfield Shipyard, Inc.	15	Libertys
Bethlehem-Sparrows Point Shipyard, Inc.	1	Tanker
	1	Special Type
California Shipbuilding Corporation	2	Libertys
	4	Victory Cargo
Concrete Ship Constructors	1	Concrete Barge
Consolidated Steel Corporation, Ltd.	4	C-1 Cargo
Delta Shipbuilding Co., Inc.	6	Libertys
Federal Shipbuilding & Dry Dock Co.	1	Special Type
General Ship & Engine Works	1	Seagoing Tug
Globe Shipbuilding Co.	1	Special Type
Gulf Shipbuilding Corporation	1	C-2 Cargo
Houston Shipbuilding Corporation	7	Libertys
Ingalls Shipbuilding Corporation	1	C-3 Cargo
	1	Coastal Cargo
	1	Special Type
J. A. Jones Construction Co., Inc.	4	Libertys
J. A. Jones Construction Co., Inc.	4	Libertys
Kaiser Cargo, Inc.	1	Special Type
Kaiser Co., Inc.	2	Special Types
Kaiser Co., Inc., Swan Island, Oregon	4	Tankers
Kaiser Co., Inc., Vancouver, Wash.	5	Special Types
MacEvoy Shipbuilding Corporation	3	Concrete Barges
McCloskey & Co., Tampa, Florida	1	Concrete Cargo
Marinship Corporation	3	Tankers
	2	Special Types
Moore Dry Dock Co.	5	C-2 Cargo
North Carolina Shipbuilding Co.	6	C-2 Cargo
New England Shipbuilding Corporation	10	Libertys
Oregon Shipbuilding Corporation	6	Victory Cargo
Pendleton Shipyards Co., Inc.	1	Coastal Cargo
Pennsylvania Shipyards, Inc.	2	C-1 Cargo
	2	Coastal Cargo
Permanente Metals Corporation	22	Libertys
Pusey & Jones Corporation	1	C-1 Cargo
St. Johns River Shipbuilding Co.	4	Libertys
Southeastern Shipbuilding Corp.	3	Libertys
Sun Shipbuilding & Dry Dock Co.	5	Tankers
	1	Special Type
Todd-Galveston Dry Docks, Inc.	1	Coastal Tanker
Walsh-Kaiser Co., Inc.	2	Libertys
Welding Shipyards, Inc., Norfolk, Va.	1	Tanker

Marinship's New Tankers

Keel laying for the first of a series of 24 large tanker ships to be named for leading oil producing areas in California was announced by Marinship Corporation, Sausalito shipyard on San Francisco Bay.

The ship now under construction is the S. S. Kettleman Hills, named for the famous oil deposit area of Kings and Fresno Counties. This will be followed by 23 other similar ships named for important California petroleum fields.

The keel section for the first ship of this series was lifted dramatically by two 90-ton cranes and dropped into place at 1:00 p.m. on May 29, at exactly the same spot where the Sausalito shipyard laid its first Liberty ship keel 23 months previously.

"We are very pleased to name this series of high-speed modern oil-carrying ships after the outstanding oilfields of California," said W. E. Waste, general manager of Marinship. "When these 24 ships, powered by their sturdy 8250-horsepower turbo-electric motors, are completed and in use on the seven seas they will form a dramatic tribute to the California petroleum industry and its men and women."

Start of the new series involves many important changes in production plans, with many new problems to be solved by engineers and workmen at Marinship. The S. S. Kettleman Hills has been designated a "pilot" ship, on which the plans and production procedures will be tested and refined.

Destroyer Escort Launched at Bethlehem

The destroyer escort U. S. S. Vammen was launched at the San Francisco Yard of Bethlehem Steel Company on May 21. The sponsor was Mrs. Earle Morgan of Aberdeen, Washington, aunt of Ensign Clarence Earl Vammen, Jr., in whose honor the ship was named.

Ensign Vammen was born in Aberdeen on October 17, 1919, and died as a result of enemy action in the Battle of Midway, the presumptive date of his death being June 7, 1942. At the time of his death he was on duty on the famous carrier U. S. S. Enterprise, serving in Torpedo Squadron Six.

CALSHIP LAUNCHING

Richard W. Emery, publicity manager for the California Shipbuilding Corporation (extreme left), and Joseph Wadsworth, industrial relations manager for the yard (extreme right), pose with the launching party when Mrs. Jerry Scanlon, wife of the regional representative division of public relations of the U. S. Maritime Commission, christened the Lincoln Victory. Mr. Scanlon is in the center, Mrs. Scanlon at his left, and Mrs. Richard Hughes, matron of honor, second from the left.

U. S. MERCHANT SHIP PRODUCTION

1936–1944

Year	Month	No. of Vessels		Deadweight Tonnage	
1936	....		9		107,938
1937	....		18		194,788
1938	....		25		289,765
1939	....		28		341,219
1940	....		55		641,056
1941	January	4		47,200	
	February	4		40,500	
	March	9		108,700	
	April	12		131,200	
	May	9		98,600	
	June	7		81,700	
	July	7		125,311	
	August	9		112,042	
	September	9		86,185	
	October	8		75,296	
	November	12		138,254	
	December	9	99	92,175	1,137,163
1942	January	16		197,628	
	February	26		289,549	
	March	26		291,473	
	April	36		401,632	
	May	57		619,779	
	June	67		749,654	
	July	71		791,667	
	August	68		752,774	
	September	93		1,016,112	
	October	81		889,737	
	November	84		892,536	
	December	121	746	1,197,191	8,089,732
1943	January	103		1,007,680	
	February	130		1,236,481	
	March	146		1,513,244	
	April	157		1,603,307	
	May	176		1,782,836	
	June	167		1,670,442	
	July	158		1,669,341	
	August	164		1,690,411	
	September	160		1,652,571	
	October	163		1,675,311	
	November	164		1,692,763	
	December	208	1,896	2,044,239	19,238,626
1944*	January	124		1,204,730	
	February	134		1,372,864	
	March	152		1,538,357	
	Total 1936–1944		3,286		34,156,238

* Production decline in early 1944 reflects conversion of high production yards to Victory ships and military types.

C-4, C1-M-AVI and Tanker Contracts

To meet the requirements of war operations, which are steadily widening in both scope and area, contracts have been awarded for the construction of 68 additional large ocean-going tankers, and certain existing contracts have been rearranged so that these tankers may be delivered by July 1, 1945, the United States Maritime Commission announced.

To take advantage of the special abilities and facilities of the Sun Shipbuilding and Dry Dock Company, Chester, Pa., in the construction of large ocean-going tankers, a contract for the construction of 24 T2-SE-A1 type tankers was awarded to that company, for delivery by July 1, 1945. This is a part of a total of 50 tankers scheduled for the Sun Shipbuilding and Dry Dock Company during 1945. To allow for the full use of facilities in the construction of these tankers, a contract for the construction of 30 C4 type transport vessels at the Sun yard was withdrawn.

Contracts for the construction of 38 T2-SE-A1 type tankers has been awarded to the Kaiser Company, Inc., Swan Island Yard, Portland, Ore., and a contract for six of the same type has been awarded to Bethlehem-Sparrows Point Shipyard, Inc., Baltimore, Md.

Contracts have been awarded to the Kaiser Company's Vancouver Yard, Portland, Ore., for the construction of 20 of the 30 C4 type vessels removed from the schedule of Sun Shipbuilding and Dry Dock Company, and to the Kaiser Company's Richmond, Calif., Yard No. 3 for the remaining 10 C4 vessels. When the contract was let to the Sun company for the construction of C4 vessels, they were to carry tanks. They are now to be completed as troop transports, and by transferring the contracts to yards where facilities will soon become vacant, it will be possible to have them completed in 1945, without interfering with the vital tanker program, the Maritime Commission said.

The award dated February 17, 1944, to the Kaiser Company's Van-

couver Yard, calling for the construction of 60 C1-M-AV1 vessels, has been rescinded in order to make those facilities available for the C4 contract; and a contract has been awarded to Kaiser Cargo, Inc., at Richmond, for the construction of nine of these C1-M-AV1 vessels in addition to the 12 already under way at that yard—all to be completed by the end of March, 1945.

The contract for the remaining 51 C1-M-AV1 vessels will be announced shortly.

Recent Fellows & Stewart Launchings

A new type of aircraft rescue boats for the Army Air Corps, designated as P510, P511 and P518, were launched recently at Fellows and Stewart yard in Southern California.

P510 is the Brig. Gen. Frank D. Lackland, and the P518, built at Wilmington Boat, is the Brig. Gen. Harold H. George. The P511 has not been named. These craft, designed by Dair Long, are 85 feet long, make better than 50 mph, and are powered with two V-type Packard motors with two Chrysler marine motors attached in tandem. The start is with a Chrysler engine, which in turn cranks the Packard motor. The horsepower ranges from 2500 to 3000.

They are spacious, roomy boats, biggest and fastest of that type ever built, and carry a crew of 14, including 12 men and 2 officers.

The Fellows and Stewart launching, a twin affair, with two boats going down the ways side by side and striking the water simultaneously, was held on April 29. The sponsor of P510 was Mrs. John B. Long, with Mrs. Samuel M. Hickson as matron of honor. The sponsor of P511 was Mrs. Victor B. Stewart, with Mrs. Elliott Gibbs as matron of honor.

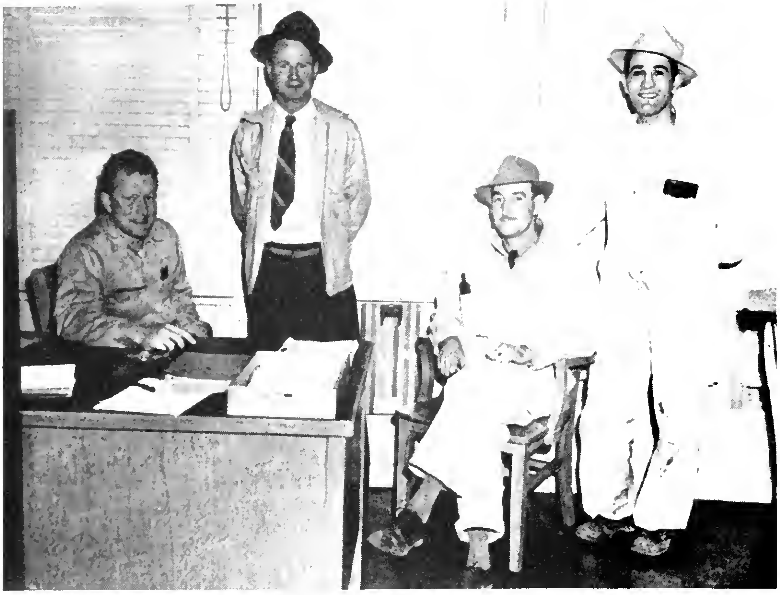
The Wilmington launching took place an hour later, with Mrs. Harold H. George, widow of the man for whom it was named, as sponsor.

Top of page: On her trial run immediately after launching on April 29, the Brig. Gen. Harold H. George, one of the first three new type 50-mph, 85-foot Army Air Corps patrol rescue boats, is shown as she speeds through Los Angeles harbor.

Center: Left to right are Dair N. Long, designer of the craft; Victor B. Stewart, boat builder of Fellows and Stewart yard; and John B. Long, manager of the California Newspaper Publishers Association and father of the designer. Picture was taken just before launching time.

Bottom: Robert E. Carlson (left), vice president of Wilmington Boat Works Inc., smiles as Mrs. Harold H. George, widow of the general for whom the craft was named, gets ready to christen the ship. Between them is Mrs. Thomas L. Miller, matron of honor, daughter of Gen. and Mrs. George.

U. S. West



AMERICAN BUREAU OF SHIPPING MARINE SURVEYORS AT KAISER CARGO CO., RICHMOND YARD No. 4.

Left to right: Thomas Purdom, John McGuffick, Stanley Marshall (senior machinery inspector, USMC) and Samuel Taormina.

KAISER CARGO CO., MACHINERY INSPECTORS, AT YARD No. 4

Seated, left to right: F. J. Murphy, N. P. Nielsen (first senior inspector) and E. Anderson. Standing, J. C. Welch, F. G. Breach, H. Tort, L. Smith and G. B. Collins.

Maritime Commission Coast Yard Inspectors

KAISER CARGO COMPANY
YARD No. 4, RICHMOND, CALIFORNIA

YARD No. 4 HULL INSPECTORS
Seated, left to right: A. F. "Gus" Hall, J. W. Davis and M. Petersen. Standing, Bill McDermitt (said to be the youngest Maritime Commission inspector on the Pacific Coast), Victor A. Pacheco (senior inspector), and Dean B. Weisenberger.

Top: M. S. Chamberlin, principal machinery inspector, U.S.M.C., Kaiser Cargo Co., Richmond Yard No. 4.

Center: N. P. Nielsen, first senior machinery inspector, U.S.M.C., Richmond Yard No. 4.

Bottom: A. P. Fenton, principal hull inspector, U.S.M.C., Richmond Yard No. 4.

(Left): YARD No. 4 ELECTRICAL INSPECTORS
Kneeling, left to right: Manuel delCorral, Enno Cencini and Ed Hartman. Standing: Harry Mason, L. G. Ellicott, Neil Cohan and Ed Finnegan, first senior inspector.

TORSIONAL VIBRATION

(Continued from page 81)

cases of this type is to adopt one of the two following alternatives: (1) use a medium-sized shafting and accept a torsional critical at some spot within the operating range, but agree not to operate the boat at this speed; (2) arrange to use especially large shafting, of possibly a tubular type.

The first alternative, keeping the critical at some point such as midway in the operating range, is accepted and used by many operators of vessels, as freight or passenger ships, where the only two speeds employed are "full ahead" and "dead slow." However, the alternative of using a larger diameter shaft is becoming more frequently employed. Any difficulty of providing for exceptionally large shafting when building the vessel is more than compensated for by an operating range entirely free of criticals.

HIGH PRESSURES AND HIGH TEMPERATURES

(Continued from page 73)

ship would burn 1240 tons, the other 1060 tons, a saving of 180 tons, or $1800. But the high-pressure ship could carry 180 tons more cargo, and assuming an average freight rate of $8 could earn $1400 additional freight money. The high-pressure steamer therefore has a financial advantage of $3200 a round trip. Assuming 200 days a year at sea, the advantage of the high-pressure vessel would be $25,000 annually."

This paper was accompanied by several charts showing "the effects produced by varying the designed steam pressure." These show that:

(1) Volume of steam per hour per shp is 50 cu. ft. for 100 psi; 12 cu. ft. for 450 psi; and 4.5 cu. ft. for 1200 psi.

(2) Steam rate per shp per hour is 11 pounds for 100 psi; 8.5 pounds for 450 psi; and 7.6 pounds for 1200 psi.

(3) The thermal efficiency of the cycle is approximately 20 per cent with 100 psi, and increases gradually to approximately 28 per cent at 1200 psi.

(4) The fuel rate is approximately 0.71 pounds per shp hour for 100 psi; 0.565 pounds per shp hour for 450 psi; and 0.49 pounds per shp hour for 1200 pounds. (The rate of 0.71 pounds for 100 pounds pressure or 0.65 for 200 pounds is based on present-day boiler, turbine and auxiliary efficiencies, and on regenerative feed heating, and all rates are based on oil fuel at 18,000 B.t.u)

We reproduce chart No. 5 of this paper, showing the heat distribution and losses and indicating the part that condensers and boilers play in the heat loss and how the condenser loss reduces proportionally as the pressure is increased. This chart assumes a constant boiler efficiency of 88 per cent.

Mr. Thaeler closes with this very interesting observation:

"In effect, when we increase the steam pressure and increase the temperature of the feed water to the boilers, we cut off a part of the condenser and make feed heaters out of it. The further we are able to go with this process, the more efficient our plant becomes. If you want an economical plant, find out how many B.t.u.'s per horsepower you are throwing away in the condenser and up the stack. If these losses are kept low, your plant is economical. You can keep them low with high steam pressure."

This, however, is very relative. On the chart of heat distribution we note that the B.t.u. per shp lost in condenser drops from approximately 6200 at 400 psi to approximately 5500 at 800 psi, a drop of 700 B.t.u. per shp or approximately 12 per cent for an increase in pressure of 100 per cent. To get a similar improvement in the higher pressure range we must take a further 100 per cent increase to 1600 psi. In other words the curve is flattening, and here we see the reason why large-capacity plants justify the higher ranges of pressures and the lower-capacity plants remain in the more conservative range.

THE AMERICAN MERCHANT MARINE

(Continued from page 65)

been repeated on a lesser scale in many Pacific areas.

The Victory Ship

As the Commission's construction program goes well into 1944, in so far as possible emphasis has been shifted from quantity of quality. The phase of great emergency construction is past. Yards building Liberty ships are completing existing contracts. The slow but dependable Liberty will be superseded in part by the faster, more powerful Victory ship powered by steam turbines and gears, and 50 per cent faster than its 11-knot predecessor. It can make more trips to the battle front.

The Commission's original long-range program also is producing increasing numbers of C-type vessels and tankers. Fifty-nine C-types were delivered in 1942; 163 in 1943. Sixty-two tankers were built in 1942; 195 in 1943.

These vessels, with the operating personnel developed under pressure of war, will provide the United States with a gigantic, powerful and well integrated merchant marine in the post-war era. The Merchant Marine Academy at King's Point, New York, is turning out hundreds of physically fine, mentally alert, well-trained young men as ships' officers. World-wide operations will furnish an increased number of competent operating personnel. With thousands of trained seamen available, these factors add up to a sum total that should fully enable the United States to remain a strong maritime nation.

This is a day to look to the future —to affirm our belief in the benefits of a strong merchant marine and plan for the wisest use of one of the greatest assets to our welfare—ships and men.

Running LIGHTS

Edited by B. H. Boynton

Who When Where

Our cover is a photomontage by Fred Bennett of publicity staff of Permanente Metals Corporation.

John A. McCone (left), president of California Shipbuilding Corp., receiving from Daniel S. Ring, director, Division of Shipyard Labor Relations, U.S.M.C., the nine-foot blue and gold Maritime merit Gold-Wreathed Eagle pennant.

Calship's Gold - Wreath Maritime Pennant

The highest production award possible for a merchant shipyard, the gold-wreathed Maritime Eagle pennant, has been bestowed upon California Shipbuilding Corporation, Wilmington, California. The pennant was given in recognition of speed and efficiency in completing 22 cycles of Liberty ships

John A. McCone, president of Calship, announced during the National Maritime Day ceremony and presentation of the pennant, that this yard has been assured by the Maritime Commission of continuing full scale work through 1945, contingent upon yard efficiency and no profound upsetting of the present military outlook.

Bilge Club Election

Upper left: Robert W. Gerhart, outfitting manager for Calship with Joe Costello and John Eidom, past presidents.

Upper right: 1944-1945 Board of Directors. T. W. Buckholz, new president (fourth from left) with E. Archibald, R. W. Decker, Floyd G. Nelson, Al F. Boro, W. Harrington and Howard Hartry.

Center: Standard Oil people; Capt. Theo. Peters, marine supt., Los Angeles Harbor; J. M. Norton, branch mgr., San Pedro; and C. R. McMillin, district sales mgr., Long Beach.

Lower left: President-elect T. W. Buckholz receives congratulations from Joe S. Costello, retiring president.

In the strip, left to right: R. G. Vanden Boom, of The Union Metal Mfg. Co., and Joe Hare with WSA, Los Angeles Harbor; Birger A. Guthe and Fred Cordes; and three ex-presidents of Bilge Club, Tom Forster, Arthur Pegg and Dan Dobler.

The Bilge Club of Los Angeles Harbor held its annual meeting and election of officers on May 2 at Long Beach. T. W. Buckholz, of Metropolitan Stevedoring Company was elected president. The Board of Directors for 1944-1945 include T. W. Buckholz; E. Archibald, of Sunset Oil Company; R. W. Decker, of San Pedro Tugboat Company; Floyd G. Nelson, of The Texas Company; Al F. Boro, of J. M. Costello Supply Co.; W. Harrington, of Bethlehem Steel Corp., Shipbuilding Division, San Pedro; and Howard Hartry, Customs Broker.

It was announced that general provisions of the by-laws have been amended so that henceforth members shall be automatically suspended in the event that dues become in arrears on or after the first Tuesday of May of each year, and that reinstatement to membership shall be made only on payment of a reinstatement fee of $2.50 plus current year's dues and approval of the majority of the Board of Directors.

The Bilge Club now has 362 members, the largest membership in its history.

National Maritime Day Feted

IN LOS ANGELES AND SAN FRANCISCO

MAY 22, 1944

Left to right: Rear Admiral Edw. Jones, Major Gen. F. G. Gilbreath, and Commodore B. C. Allen, Fred L. Doelker, president of the Propeller Club; Capt. Edw. Mausschardt, Commander John Von Schullenberg, chaplain, Dutch Merchant Marine, and Arthur Poole.

Left: San Francisco's Mayor Roger Lapham and Guest Speaker Almon Roth at the S. F. Chamber of Commerce luncheon on May 22.

Right: Vice Admiral John W. Greenslade speaking at the National Maritime Day meeting at the Biltmore Hotel in Los Angeles on May 22.

(Official U. S. Navy photo)

Capt. Gelly, Major General Cortland Parker, Rear Admiral Albert Ware Marshall, Paul Muni, and E. A. Coons, president of the Los Angeles Transportation Club, at the Los Angeles Maritime Day luncheon.

Left to right: Joe J. Geary, Henry F. Grady, Comm. M. E. Crossman, Carl W. Flesher, John Cushing and Capt. James Boyd at the San Francisco Maritime Day program.

Permanente's

Launching party of the 500th ship include J. L. Bates, Mrs. Bates, sponsor; Mrs. Harry Humbert, flower girl; Miss Virginia Clagett, maid of honor, and Rev. Edward K. Strong.

From the first to the five hundredth, from the Ocean Vanguard to the Cecil G. Sellers, with a lot of toil and sweat and a couple of million tons of steel in between . . . five hundred ships' worth . . . in the brief span of two and one-half years. Such is the record of the Permanente Metals Corp. Shipyard at Richmond. In the 875 days between the first delivery on October 27, 1941, and the history-making 500th delivery, the San Francisco Bay region has become the world's leading shipbuilding center. From Permanente, but one of 17 Liberty shipyards in America, has come over 23 per cent of the nation's Liberty ships.

It was business-as-usual in the shipyards that afternoon. There was no star-spangled oratory, no whistles were blown, and no celebration took place, although a much-deserved one would have been in order. While workers milled over and around the hulls, a small group of officials representing them calmly went about their appointed task of delivering to the United States Maritime Commission their five hundredth Liberty

On deck of the Cecil G. Sellers, the 500th Permanente baby, are Fred Doelker, vice president of the Grace Lines; Charles Stewart, principal hull inspector, U.S.M.C., at Permanente Metals Corp.; T. A. Bedford, assistant manager of Permanente, and John P. Dowling, master.

Doctor Clay P. Bedford, vice president and general manager of Kaiser Cargo, Inc., delivers to Charles Stewart the symbolized 500th Liberty ship.

500TH Ship

James A. Kastrosky, principal machinery inspector, U. S. M. C.; Chas. Stewart, Fred Doelker and C. P. Bedford.

vessel, which established an enviable production record never equaled by any shipyard in all history.

On December 20, 1940, the old world had begun to rip at the seams when the newly organized Todd-California Shipbuilding Corporation accepted a contract with the British Purchasing Commission for thirty cargo vessels . . . and a month later a crew of construction men waded through the mud to start what was to be Richmond Yard Number One. It was hardly a shipyard when the keel of the first ship, the Ocean Vanguard, was laid . . . and there was a lump in the throat of every workman that proud day when the Vanguard hit the water.

Launchings gathered momentum after that. Ships began sliding down the ways faster and faster. As precious time sped by, the men and women of Permanente began turning out ships as if by magic. Keel laying to delivery time was cut from 206 days at first to an average of 26 at present. Man-hours per ship were reduced from around 900,000 to little over 200,000.

Along the milestones in the yard's history was Yard Two's fifth ship, the Anthony Wayne, delivered 38 days after launching. The John Fitch was launched on August 28, 1942, twenty-four days after keel laying. Better—but nothing to compare with the Robert E. Peary, famous Hull 440. All records were smashed (and have remained smashed) when the Peary was launched on November 12, four days, fifteen hours, and twenty-six minutes after keel laying. The Peary sailed out of the bay for the South Pacific fully loaded—deck cargo and all—14 days after her keel was laid.

With 500 Libertys behind her, and only a few more to go to complete the program, Permanente has already launched four vessels and laid eleven keels under the new Victory ship program. Truly an epoch. Five hundred Liberty ships delivered in two and one-half years—the Ocean Vanguard to the Cecil G. Sellers.

Surrounded by 500 models of delivered Libertys are, left to right: Jerry Scanlon, U.S.M.C., Public Relations; T. S. Bedford, James A. Kastrosky, Chas. Stewart, Fred Doelker, C. P. Bedford, E. T. Senter, Grace Line port supt.; Art Innis, U.S.M.C. Delivery Coordinator, and W. A. Cannon, ex-assistant manage, Yard No. 2.

Above: left to right: Capt. Joseph W. Fawler, USN; G. K. Nichols, vice president; Capt. E. M. Olsen, Capt. G. R. Munro, Terminals Department of Matson.

Above, left to right: Capt. A. G. Townsend, marine manager; Captain Walter F. LaFrenz, USN; H. J. Wolters, Port Engineer; R. De Gorag, catering superintendent; Capt. M. J. Bulger, Port Captain.

Matson Day At Shrine Club

Our camera caught these personalities at the Shrine Club luncheon, held in May, in honor of the Matson Line.

Adding sparkle to the luncheon was Clara Inter (Hilo Hottie) caught here with Hugh Gallagher and Shriners W. R. Bradshaw and Joe Langmore.

Hugh Gallagher at the mike did the honors for the feted ship-operating guests while Wm. Poyner, chief Rabban of Islam Temple and Clark Bensen look on.

Left to right: J. B. Banning, Jr., superintendent, Wilmington, California; C. A. McGee, assistant manager, Industrial Relations; E. H. Hurst, Freight Department; P. F. Cannon, assistant Catering Superintendent; F. F. Fickett, Freight Department; W. R. Jenkins, executive department; Army Major (a guest); Carl W. Flesher, regional director, U. S. Maritime Commission; E. D. Scheley, assistant Labor Conciliator, I. R. Department; W. R. Bradshaw, Labor Conciliator, I. R. Department; Joe Bale, Editor Matsonews.

Presentation of maritime gold-wreathed pennant, left to right: C. P. Bedford; Al Fountain, asst. yard superintendent, Yard No. 2; T. A. Bedford, asst. mgr., Permanente Metals Corp.; and Carl W. Flesher, who presented the flag to Al Fountain.

Permanente Flies Gold-Wreathed Pennant

National Maritime Day was celebrated at the Richmond shipyards with the hoisting of the gold-wreathed Maritime Eagle Pennant atop the masts proudly possessed by the men and women of Permanente Metals Corporation. Presentation was made by Regional Director Carl W. Flesher of the Maritime Commission to Superintendent Jack Konrad for Yard One and Superintendent Al Fountain for Yard Two.

Announcement of the award came in a telegram from Rear Admiral Howard L. Vickery, chairman of the U.S.M.C. Board of Awards at Washington, to Henry J. Kaiser stating: "The Board in recognition of your continuous achievement in Liberty ship construction has awarded your yards the Gold-Wreathed Martime Merit Eagle Pennant. This pennant is to be flown over your yards as a symbol of 22 consecutive awards of merit for outstanding achievement in the Nation's victory fleet program."

Three days before, Permanente had delivered its five hundredth Liberty ship, an unmatched feat in little more than two and a half years since the first vessel was turned over to the Maritime Commission. With the Gold-Wreathed flag, Yards One and Two become one of the select group of four shipyards throughout the country which have received 22 consecutive awards of merit as well as the Maritime 250 Club flag signifying they have built 250 ships.

During the Maritime Day ceremonies, Clay P. Bedford, vice president and general manager of the shipyards, congratulated members of the Maritime Commission for their war-winning program, and the men and women who have carried it on.

Programs in each of the four yards during the lunch hour on May 22 honored heroes of the Merchant Marine. "If any of the fellows I used to work with are out there, I'd like to shake their hands," said guest Bob Frankichevich in Yard Two. Bob left his shipyard job on December 7, 1941, and the next day he signed up with the Merchant Marine. He had been for years on a dozen different ships, most of them rust-eaten relics, a few of them smoothly operating, well-built emergency cargo vessels—Liberty ships.

It was on a Liberty, damaged by Axis action last year, that Bob earned his scars. He and his mates were ordered to abandon ship, and they put out on a raft, alone in no-man's waters 1700 miles from Madagascar. Nineteen days and navigating by guess brought Bob and his mates to shore.

PROMOTIONS

John R. Wagner, who served American-President Lines as assistant traffic manager, has been promoted from Major to Lieutenant-Colonel. He is stationed at Fort Mason, San Francisco.

Another advancement was Joseph Friedlander, formerly general manager of American Trading Company, of San Francisco, from Major to Lieutenant-Colonel. He is in the Army Air Transport Service on the East Coast.

CELEBRATION AT YARD NO. 1

War wives were honored along with a group of 20 from Millbrae Merchant Rest Home. Burner Bob Vanies, baritone and 12 "Harmonettes" form a musical background for presentation ceremony.

WHO'S WHO afloat and ashore

Jean M. Allen of Joshua Hendy

Hendy Engages Noted Hydraulic Dredge Expert

From Chas. E. Moore, president of the Joshua Hendy Iron Works, Sunnyvale, Calif., comes the announcement that Jean M. Allen has been appointed hydraulic-dredge consulting engineer.

Mr. Allen is known throughout the world as a designer of modern successful dredges. In the past thirty-eight years he has designed over 60 dredges ranging in discharge size from 6 to 30 inches. He has had many years of experience in handling actual dredging operations on both inland and tidal waters and has had supervisory or executive charge of dredging contracts totaling approximately 150,000,000 cubic yards.

Now his experience is coupled with the modern production methods —precision workmanship, and facilities of the Joshua Hendy Iron Works.

Hendy has long been identified with the dredge industry as manufacturer and supplier of component parts for hydraulic suction and bucket-type dredges. Today the company is equipped to build practically every part of the dredge, including steam turbines, diesel engines, electric motors, generators, hoist equipment, pumps, gears, etc., in its own shops. This places responsibility with one manufacturer, assuring a more satisfactory repair and replacement service to the dredge operator.

L. A. Bilge Club Annual Barbecue & Golf Tournament to June 24

President Joe Costello announced May 2 that the Fifteenth Annual Barbecue and Golf Tournament of the Los Angeles Harbor Bilge Club will be held at the Palos Verdes Country Club on June 24th. This is the outstanding event of the year, and all-out capacity attendance is anticipated.

"Casey" Jones Passes

C. H. M. Jones, assistant to president of Todd Shipyards Corp., One Broadway, New York, and widely-known veteran New York newspaperman, died unexpectedly in his sleep at his residence in Montvale, New Jersey, on May 25. He was 58.

"Casey," as Mr. Jones was known to newspapermen throughout the world, leaders in the marine field, and associates in the Todd organization, which he joined in 1919, carried on with his work up to a few hours before he was stricken.

He was assistant to John D. Reilly, president of Todd Shipyards Corp., at the time of his death, and administered policies of the corporation dealing with the vast personnel of the world-wide ship repairing and shipbuilding organization as well as public relations. It was under his personal direction that the wartime activities of the Todd Shipyards throughout the country and abroad were coordinated and widely publicized. He served in a similar capacity during World War I with William H. Todd, founder of the corporation.

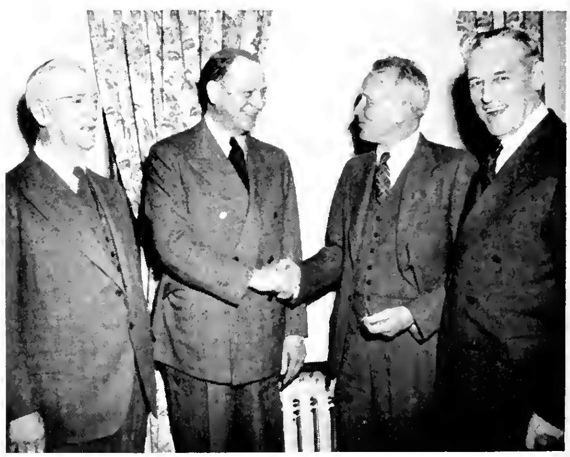
Appointment

George French, formerly in charge of the woodworking department of Western Electric Company, has become associated with United States Plywood Corporation as Production Engineer.

A member of the Executive Committee of the Wood Industries Division of the American Society of Mechanical Engineers, Mr. French has done industrial research for U. S. Forest Products Laboratories, and was a consulting engineer for the National Lumber Manufacturers Association.

SHIPPING LEADERS MEET

Congressman Richard J. Welch (of California) with William P. Roth, president of Matson Navigation Co.; Rear Admiral Emory S. Land, chairman of U.S.M.C., and Almon E. Roth, president of the National Federation of American Shipping, Inc.



Jenkins Bros. Announcement

T. C. Irwin, Jr., Pacific Coast representative for Jenkins Bros., marine valve manufacturers, announces the appointment of the M. E. Gray Company, 2855 E. Slauson Avenue, Huntington Park, as a warehousing distributor of Jekins valves. The Gray firm is now expanding its representation to cover the entire Los Angeles Harbor area. Members of the firm have specialized in valves for 15 years.

Exide Announces Two New Officers

The Electric Storage Battery Company, Philadelphia, announces the election, by the board of directors, of C. F. Norberg to the office of vice president in charge of manufacturing and D. N. Smith to that of comptroller.

Harry R. Winkle

Winkle Elected Vice President Of Fiberglas Corporation

Harry R. Winkle, Owens-Corning Fiberglas Corporation comptroller and treasurer, has been elevated to the post of vice president. This action was taken at a recent meeting of the corporation's board of directors in recognition of "the increased importance of the financial phase of the business."

Mr. Winkle will continue to serve as comptroller and treasurer, a post he has held since the Fiberglas Corporation was formed November 1, 1938. He has been associated with Owens-Corning and predecessor companies since 1923.

He is a member of the board of directors of the Fiberglas Corporation whose general offices are in Toledo, Ohio, and is a member of the National Association of Cost Accountants. He is a native of Lima, Ohio.

Hot off the Press

"Health on the Production Front" is the title of a timely booklet issued by the National Association of Manufacturers of New York. It sets forth in compact, understandable form, ways of improving efficiency, reducing absenteeism, lowering labor turnover and preventing accidents. It is a comprehensive reference manual to aid management in the conservation of man power through good health practices.

• • •

A new booklet, "Emerson Electric Aircraft Motors," has recently been released by The Emerson Electric Mfg. Co. and illustrates their complete line of aircraft motors, designed for volume production and characterized by their high-speed operation and light-metal construction.

• • •

"Properties and Uses of Zinc Borate-3167, Fire-Retardant" covers the vital subject of fire-proofing. This booklet has recently been released by The New Jersey Zinc Company of New York.

• • •

Fairbanks, Morse Co. of Chicago has printed a bulletin, No. 5813FS, on Fire Pump Units for gasoline-driven engines with 500, 750 and 1000 gallons capacities. The fire pumps are approved and listed in combination with the Continental M330 heat exchanger engine and special accessories by the Underwriters' Laboratories.

• • •

"Pipe and Tube Bending Handbook" is the title of an informative booklet distributed by Copper & Brass Research Association of New York. It shows typical methods and equipment for pipe bending purposes, and includes many important tables on physical properties, capacities, thickness and diameter tolerances and other related data.

• • •

The Yale & Towne Mfg. Co., Philadelphia Division, has published a booklet called "Modern Materials Handling Machinery," prepared as an aid to American industry and management in making the fullest practical use of machinery. Efficient methods of handling machinery and all industrial problems are illustrated through the use of the Yale equipment.

• • •

"Government Specifications for Plywood and Adhesives" is a review bulletin prepared by The Resinous Products & Chemical Company, Philadelphia, on various Government specifications under which plywood is now being purchased for use of the Armed Forces.

• • •

Pipe and Tube Bending Handbook, published by The Copper & Brass Association, is a complete treatise showing methods and devices for bending pipes and tubes of copper and its alloys. The book contains 80 pages of text with 113 illustrations, including 35 pages of unit weights of tubes of different alloys with varying diameters, wall thicknesses and shapes.

• • •

"The Story of the World's Finest Precision Ground Universal Joints" is the title of a 24-page booklet distributed by The Dix Manufacturing Co. It interestingly describes and illustrates the "how" and "why" the Dix aviation-type joints have earned their reputation.

• • •

Chain Drive Table Book, No. 1991, by the Link Belt Company, Chicago, shows various sets of tables and explains how to shorten the time required for calculating center distances and lengths of chain drives when operating over cut-tooth wheels.

• • •

The third edition of "Operator's Handbook on American Steam and Electric Cargo Winches" has been published by American Hoist & Derrick Company of St. Paul, Minn. The booklet, No. W1A-43, brings the drawings up to date, and several pages have been added covering recommended operating clearances for the various parts.

• • •

"Aerco Hydraulic Multi-Grip-Chuck," a folder issued by Aerco Corporation, Hollydale, California, contains complete information, illustrations, specifications and prices on both models of the new chuck, which is said to speed up milling operations by as much as 500 per cent.

• • •

Strata-Flow water coolers, eliminating warm-up, wet systems, and control problems, are fully illustrated and described, along with various equipment units, in a new bulletin issued by Drayer & Hanson, Los Angeles, Calif. Various tables add to the value of the bulletin to the engineer user.

• • •

"Speedairbonds," Bulletin 243, issued by Sterling Varnish Company, Pittsburgh, Pa., contains descriptions of air-drying, insulating varnishes and various Sterling specialty products.

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Sea-Tac Has Changed Its Name

Effective June 1 the name of the Seattle-Tacoma Shipbuilding Corporation, with yards at both Seattle and Tacoma, was changed to Todd Pacific Shipyards Inc. The announcement was recently made by R. J. Lamont, president of the company, who stated: "The name Todd has been identified with shipbuilding and ship repairs in Seattle and Tacoma for a quarter of a century and we want to perpetuate that name in the industry."

New Office Location

The National Federation of American Shipping, Inc., announced the removal of its offices to 1341 Connecticute Avenue, N. W., Washington, 6, D. C.

The new headquarters for the Seafarer's International Union of North America are now in the Seaboard Building, 105 Market Street, San Francisco.

At the annual election of stockholders, H. G. Tallerday has been re-elected chairman of the board of Western Pipe & Steel Company.

Other officers re-elected included L. M. Slater, president; R. D. Plagemann, F. S. Howard, L. W. Delhi and W. H. Schutte, vice president, and Reese Tucker, secretary-treasurer.

J. Neil Brophy now represents the Engine Division of Enterprise Engine & Foundry Company of San Francisco in the New England States. He is operating out of the New York office. Prior to his new post, he spent six weeks at the main office and plant in San Francisco.

Gerald A. Dundon was recently elected a vice president of Pope & Talbot. He will pursue his duties as Atlantic Coast manager of the McCormick Steamship Company, subsidiary of Pope & Talbot and will continue to make his headquarters in New York City.

News From Shipping World

Colonel Thomas G. Plant, one of the first steamship executives to leave private industry to serve his Government, has been awarded the Legion of Merit by the War Department.

The former vice president in charge of operations for the American-Hawaiian Steamship Company won the signal honor for his achievements in the Southwest Pacific range as chief of water transportation and also in charge of supplies.

The War Department states that Colonel Plant's ability solved the water transportation problems, installations and operations in the islands north of Australia.

The Government's award carried one of the finest tributes accorded in this war, one of many that have been won by Pacific Coast leaders in the maritime industry.

Advices received recently state that the Seaboard Machinery Corporation of Cliffside, New Jersey, has moved its offices to 29 Broadway, New York.

Shipmates of Captain Harry J. Parker were advised that the popular former American-Hawaiian Company skipper had been named chief surveyor of the Board of Underwriters of New York. He succeeded the late Captain Alfred J. Evans.

Ralph H. Compello has succeeded Fred R. Huntington as naval architect for the Walsh-Kaiser Company, Inc., shipbuilding division in Providence, Rhode Island.

Appointment of Captain W. T. Lion as manager for Flood Bros., was announced. He was formerly marine superintendent on the Pacific Coast for Moore-McCormick interests. Before this, he served Swayne & Hoyt as manager of operations until they sold their sixteen point type ships in 1939.

T. S. McPherson has resumed his post as vice president of the American-Hawaiian Steamship Company, after resigning as assistant deputy administrator for ship control of the War Shipping Administration.

Chester W. Norton, veteran maritime official, has joined the Seattle staff of the International Forwarding Company.

C. N. Guckert is now in charge of port engineering for the Seas Shipping Company in San Francisco, the same berth he held for the firm in New York.

Captain William F. Barry is master of the S. S. Joshua Hendy. Well known on the Pacific Coast, he is a resident of Seattle. The vessel is operating in Mediterranean war duty and is under operation of the Coastwise Pacific Far East Line of San Francisco. She was built by Permanente Metals Corporation at Richmond, Calif.

New Director, Division of Large Vessels Procurement

Walter R. Gherardi has been appointed Director of the Division of Large Vessels Procurement, War Shipping Administration, to succeed Thomas M. Torrey, who resigned recently to accept a commission as lieutenant commander in the Coast Guard, it was announced recently.

Gherardi, who came with the WSA in May, 1942, has been serving as Assistant Director of the Division, in charge of domestic vessels. Prior to coming with the War Shipping Administration, he was engaged for more than 15 years in the marine insurance underwriting business in New York City.

Gherardi will also act as a member of the newly formed Committee on Vessel Compensation of the WSA.

Change in Firm Name

Charles E. Neal, executive vice president and general manager of the Brooks Equipment Corporation of California since the formation of the firm in 1942, announces dissolution of the corporation and formation of the Brooks Equipment Company, a partnership embracing all the employees of the company in its four West Coast offices. Mr. Neal will be the general partner, and employees at San Francisco, Los Angeles, Seattle and Portland will be limited partners in the new firm.

The Brooks Equipment Company represents the Brooks Equipment Corporation, original developers of the variable angle hinged joint using a ball and socket gear; the Wiggins Oil Tool Company of Los Angeles; the American Metal Moulding Company, Irvington, New Jersey, and other manufacturers of marine equipment on the Pacific Coast.

The Seattle offices and warehouse of the company were recently moved to new and more commodious quarters at 1101 Fourth Avenue, Mr. Neal states, with C. B. Myers in charge of that territory.

Headquarters of the company are at 636 Potrero Avenue, San Francisco, where large stock of parts are warehoused for quick delivery to shipyards and other users. Other stocks are carried at Los Angeles and Seattle.

Bethlehem's Service Star

Renewal of the Army-Navy "E" Award with the addition of a Service Star to the San Francisco Shipyard of Bethlehem Steel Company has been announced by the Navy Department. In a letter notifying the yard of the Award Admiral C. C. Bloch, U. S. N. (ret.), said, "The men and women of the San Francisco Yard have achieved this high honor by continuing their splendid production in such volume as to justify this renewal of their award."

Presentation of the new flag with the Service Star took place on Memorial Day near the main entrance gate of the yard at 20th and Illinois Streets.

The original Army-Navy "E" Award to the San Francisco Yard was made in December, 1942, the yard having swung into full production in the war effort shortly after Pearl Harbor. The yard has been engaged in building and repairing combat vessels for the U. S. Navy as well as the repairing and reconditioning of non-combat ships.

The types of combat ships built in this yard include cruisers, destroyers, and destroyer-escorts. A total of 44 vessels in these classes has been built for the U. S. Navy since 1939. The newest of these is the U. S. S. Vammen, a destroyer-escort launched Sunday, May 21.

Ships to the number of over 2000 have been repaired in the yard since the war began. These include English, French, Russian, Dutch, Danish, Norwegian, Swedish, Greek, Jugoslav, Spanish, Mexican, and captured Italian and German vessels, in addition to those under the control of the U. S. Navy and the War Shipping Administration.

An outstanding example of a large and complex job done in the yard is the 32-000-ton battleship Pennsylvania, on which extensive repairs were made after the damage suffered at Pearl Harbor. The ability to handle a large volume of work is illustrated by the fact that right after Pearl Harbor a number of battleships of the U. S. Navy were being completely reconditioned at one time by the San Francisco Yard. This was a day and night job during which miracles were performed to get the vessels in shape in the quickest possible time. Other work for the Navy includes a score of different types of ships, from small landing barges to flat tops.

Repair and conversion jobs done here on other than naval vessels include the names of ships famous the world over. The Queen Elizabeth, sister ship to the Queen Mary and one of the world's great ships, was a partial troop conversion job. The Aquitania was converted to a troop ship for the British Government.

The French liner Ile de France was likewise converted to a troop transport. The well known Pacific Coast liner H. F. Alexander, holder of many speed records, was also converted to a troop transport and turned over to the British.

Captain Frank Beatty, USN, presents the Army-Navy "E" award flag, with Service Star to John A. Cummings, secretary of the War Production Committee, at the Memorial Day ceremonies at San Francisco Yard of Bethlehem.

Crocker-Wheeler Awarded "M" Burgee and Victory Fleet Flag

On National Maritime Day, the United States Maritime Commission presented to Frank W. Mencik, factory superintendent of Crocker-Wheeler Electric Manufacturing Company, Division of Joshua Hendy Iron Works, Ampere, New Jersey, the Maritime Commission "M" Burgee and the Victory Fleet Flag on behalf of the Crocker-Wheeler workers. A presentation was made by Mr. A. D. MacLean, Director, Production Division, United States Maritime Commission with Mr. A. J. M. Baker, General Manager of the Crocker-Wheeler Electric Manufacturing Company, presiding.

The "M" award was given for the manufacture and development of specially designed electrical equipment for Maritime Commission ships. This award carries with it the coveted privilege of flying the Maritime "M" pennant" and the Victory Fleet Flag.

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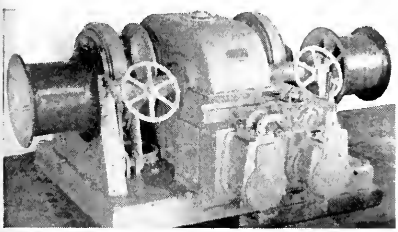


TYPE BWA-2 Totally Enclosed Steam Windlass, 1⅝" Chain. Developed in co-operation with USMC Pacific Coast Office, for barge program. Available in sizes to 2½" chain.

MARKEY MACHINERY CO., Seattle, Washington

Marine Auxiliary Machinery

"Cunningham"
Air and Steam
WHISTLES

DORAN COMPANY

Manufacturers

SEATTLE, WASH.

PUMPS FOR THE FOLLOWING SERVICES

Boiler Feed . . Ballast . . Bilge . . Brine . . Butterworth : : Cargo Oil . . Condenser Circulating . . General Circulating . . Condenser Condensate . . Heating Condensate . . Fire . . Evaporator Plant . . Distilling Plant . . Drain . . Fuel Oil . . Lubricating Oil . . General Service . . Fresh Water . . Salt Water . . Sanitary . . Fuel Transfer . . Diesel Engine Cooling.

TYPES: Centrifugal • Reciprocating • Self Priming

WARREN PUMPS

WARREN STEAM PUMP CO., INC., WARREN, MASS.

Booms for Victory Ships

One of the busiest industrial plants on the West Coast now engaged in marine manufacturing is the plant of Pacific Union Marbelite Co., of Los Angeles, a wholly owned subsidiary of The Union Metal Manufacturing Co. of Canton, Ohio.

R. G. VandenBoom, president of the Southern California Company and Western District Manager for Union Metal Mfg. Co., points with pride to the production record at his plant, which is engaged in the fabrication and assembly of "Monotube" tapered, tubular, steel booms. Present orders are mainly on five-ton Victory ship booms, the tubes of which are of cold rolled steel, shipped to Los Angeles from the Ohio plant for fabrication and assembly.

To lend an important hand in the work now going on at the Los Angeles plant, E. J. Masline has just come to the Coast as the new General Manager of Pacific Union Marbelite Co. Mr. Masliine has been with the parent organization in the East since 1911, a 32-year manufacturing record. Mr. Masline is rapidly becoming acquainted with the key factors in the Pacific Coast marine construction field.


R. G. VandenBoom, president


E. J. Masline, new general manager


15-ton "Monotube" boom under 20-ton test at Calship Yard, Los Angeles Harbor.

A Tale of a Liberty Ship

A report issued late in May revealed another incident of a crew aboard a Liberty ship under air attack. The vessel is the S. S. James Marshall and was in the command of Captain Ragnar W. Roggenbihl of San Francisco. When the attack by German air forces occurred, the vessel was at an Italian beachhead. A bomb crashed through the deck and penetrated the crowded crew's mess, killing 13 seamen and soldiers. The freighter became a flaming inferno and started to settle in the water. Captain Roggenbihl ordered the vessel abandoned.

Subsequently it was learned that the vessel could be saved. Her cargo of gasoline and ammunition was urgently needed by the soldiers who had gained a foothold at Salerno, and Captain Jonathan M. Wainwright IV, son of famed General "Skinny" Wainwright of Corregidor, was ordered to take command. Wainwright's own ship, the Bushrod Washington, had been blown up. For his heroic work Captain Wainwright won the Merchant Marine Distinguished Service Medal.

Accompanying the citation was this description:

"The engine room of this ship was flooded with 30 feet of water—her deck gear was almost completely wrecked—and the bodies of dead soldiers, sailors and merchant seamen lay about her deck. After caring for the wounded and dead, Captain Wainwright, aided by nine volunteers from his own crew, determinedly labored for nine days under exceptionally dangerous conditions to get this vital cargo landed."

The ship, after being discharged, was taken in tow by another Liberty ship through heavy seas and high winds to Bizerte for repairs.

New Editor of Sylvania News

Richard G. Mackey of Bronxville, N. Y., has been added to the advertising staff of the Radio Division of Sylvania Electric Products Inc., as editor of Sylvania News, it was announced by Terry P. Cunningham, advertising manager, Radio Division.

Mr. Mackey, formerly an engineering aide of a New York construction engineering firm, succeeds Richard Merrill who recently transferred to the company's Industrial Relations Department. Among his assignments was an eight-month stint in Panama, working on a $50,000,000 project for the Navy.

The new editor was born in Kalamazoo, Michigan, but moved to Pelham, N. Y., in his boyhood, and has lived in Bronxville for the last two years. He completed his studies at the University of Illinois. He will make his headquarters at the New York offices of Sylvania, 500 Fifth Avenue, New York City.

•

FULLER'S BASKETBALL TEAM

First row, left to right: Sgt. Les O'Gara, Don Dean, asst. team mgr., M. G. McKinlay, team mgr.; Major Dana Fuller, H. B. Wilson, Eddie Oram, captain-coach, civilian attached to Army. Second row: Sgt. John Patterson, Lt. H. S. Pollard, Capt. "Bunny" Edwards, R. R. Bernard, civilian with Lockheed; Pvt. "Chuck" Keller, Tommy Simovich, USN; Ted Eckerman, USN; Walt Daggert, civilian with Rubberset Co.

•

Fuller 49'ers Basketball Team

This team is composed of ex-college stars and is led by Eddie Oram, former USC All-American.

Major Dana Fuller, who was formerly W. P. Fuller & Co. sales promotion and advertising manager, is now commanding officer at Gary Field, Blythe, California. His brother, Frank Fuller, who twice won the Bendix Race, is a test pilot for Douglas. Captain Bob Fuller, brother of W. P. Fuller, Jr., has returned to this country from the South Seas after 59 missions. H. B. Wilson, who is in the picture, is the general manager, Southern California and Arizona Division of the company.

At the present time this team is tied for first place in the Los Angeles Municipal AA Basketball Post-Season League, and played the L. A. Traffic Squad for the championship on May 29.

Paul Hiller Expands Staff

Paul W. Hiller, marine equipment, 315 Avalon Blvd., Wilmington, Cal., and marine field engineer for Walter Kidde & Co., Inc., of New York, announces that **C. Elmer Gischel,** chief of Kidde's sales promotion, was selected industrial advertising Man-of-the-Year for 1943. The company has established its own district office in Los Angeles under John M. Noble, who for the past four years has been manager of its aviation division in New York.

Mr. Hiller's organization at Los Angeles Harbor now includes Edgar B. Birge, who is in charge of the Bendix Marine line; Nicholas J. Fish, Mr. Birge's assistant, and Albert G. Wiklund, superintendent.

In the message to Paul Hiller sent by President John F. Kidde, announcing the award to Mr. Gischel, it was also announced that C. L. Griffin has been appointed assistant vice president in charge of aviation sales; H. H. Dierksen continues as manager of the marine department; G. F. Ives continues in his present assignment as advertising manager. A. M. Doxsey is vice president in charge of sales.

Notice

At the annual meeting of The Wm. Powell Company which was held on April 25, the following were re-elected to office:

H. H. Coombe, chairman of the board and treasurer; James Coombe, president and general manager; Geo. E. Weitkamp, first vice president and secretary; David Forker, vice president; Oliver F. Gang, vice president; Wm. Heilig, vice president; Elmer R. Noll, vice president.

The board of directors also announce the election of the following additional vice presidents: Wm. R. Kraus, Wm. E. Minor, Harry C. Morine, E. K. Pierce, E. W. Voss, and Wilton Husing as assistant to the president.

NECROLOGY

Friends up and down the Pacific Coast maritime world extended sympathy to R. C. "Ray" Jones, port engineer for the General Petroleum Corporation, upon the death of his nephew, Lieutenant Richard C. Hughes, killed in action in Europe.

Lieutenant Hughes was the son of the late Joseph Hughes, himself a widely-known marine engineer and a grandson of the late Allan McCullough, a charter member of the M. E. B. A. Another uncle is Allan McCullough, Jr., a guarantee engineer for the U. S. Maritime Commission, attached to the Permanente Metals Corporation, Richmond shipyards.

The air hero was killed after eight months as a combat flyer with a record of more than 70 flights over Germany. He was flying a Mustang plane with the famed squadron of Colonel Howard when he lost his life. He had been decorated with the air medal and three Oak Leaf clusters.

He is survived by his widow, Mary, who resides in Los Angeles.

The War Shipping Administration reports the death from natural causes and burial at sea of Captain Levi J. Plesner, of New Orleans, Louisiana, one of the most colorful skippers ever to sail the Pacific.

A contender at one time for the heavyweight boxing crown, Captain Plesner was known as king of a South Sea Island.

During the present war as Chief Officer of the SS Prusa, the seamanship of Captain Plesner was credited with saving the lives of half the crew when the vessel was torpedoed and sunk in the Pacific. He was later master of the SS John Hancock which was torpedoed and sunk in the Caribbean. Captain Plesner was credited with saving his entire crew with his superb seamanship.

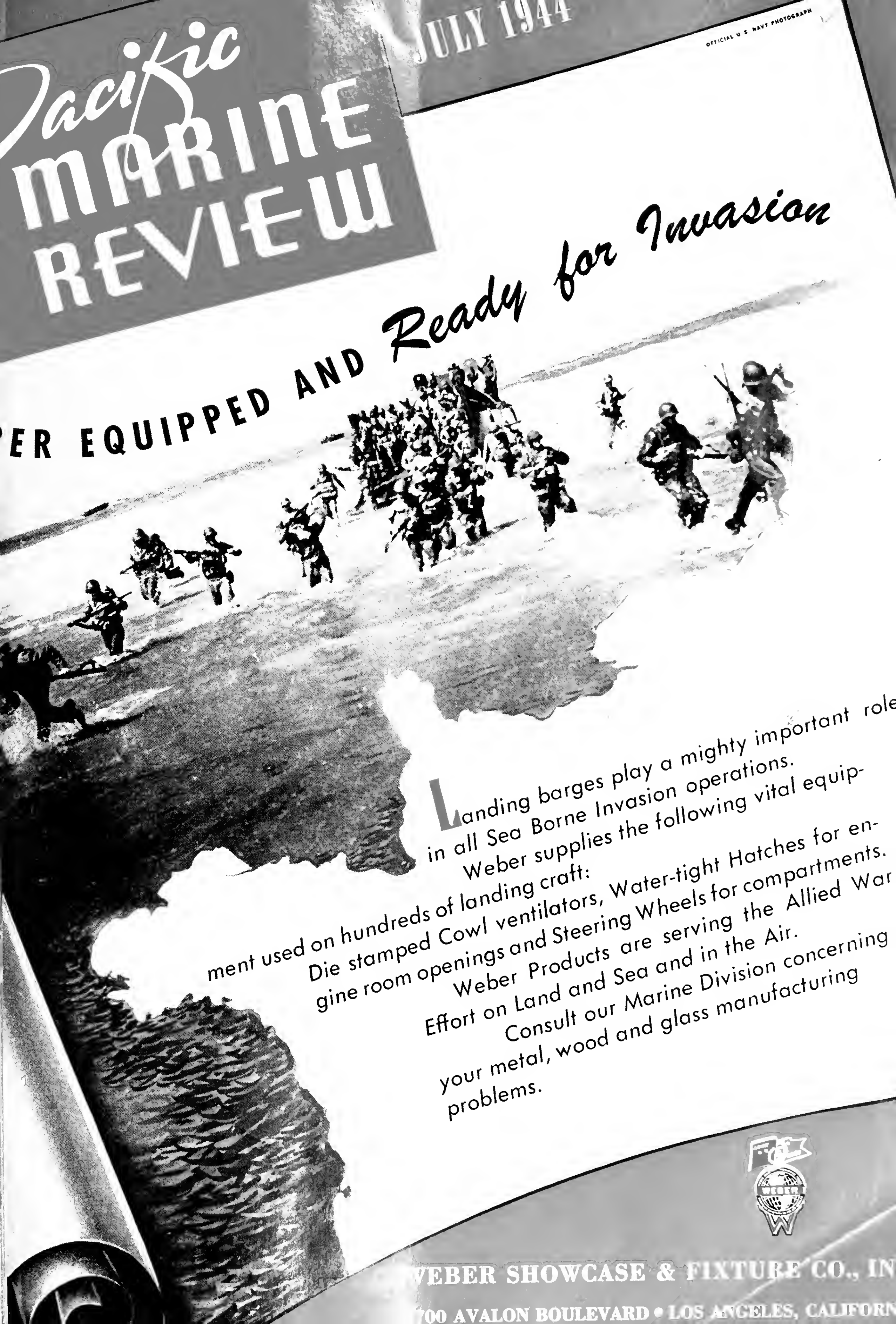
The death of George G. Raymond, 77, former vice president of Todd Shipyard Corporation and chairman of the board of its subsidiary, Tietjen & Lang Drydock Co., was received on May 6 with regret by his friends in Pacific Coast maritime circles.

Mr. Raymond was president of Tietjen & Lang until the concern merged with the Todd interests. He played an important role in the development of the torpedo while identified with the E. W. Bliss Company.

A career of a quarter of a century in Puget Sound marine activities ended last month with the death of Captain H. C. Hansen, 75, who was manager of the Willapa Harbor Stevedoring Company.

During his Pacific Coast career he operated various marine enterprises in British Columbia, Columbia River and Willapa Harbor. He was engaged in sailing ship building in Tacoma and Victoria, B. C. Such well known ships as the H. C. Hansen, the Nottingham, the C. F. Clise and the Vancouver which was subsequently rechristened the Margaret Sterling and later re-named the Tradewind now operating in the South Pacific, are some of the ships he built.

Captain Hansen was skipper of the Vancouver when she plied between Honolulu, San Francisco and Puget Sound.


Pacific MARINE REVIEW
JULY 1944
OFFICIAL U. S. NAVY PHOTOGRAPH
ER EQUIPPED AND Ready for Invasion
Landing barges play a mighty important role in all Sea Borne Invasion operations.
Weber supplies the following vital equipment used on hundreds of landing craft:
Die stamped Cowl ventilators, Water-tight Hatches for engine room openings and Steering Wheels for compartments.
Weber Products are serving the Allied War Effort on Land and Sea and in the Air.
Consult our Marine Division concerning your metal, wood and glass manufacturing problems.
WEBER
EBER SHOWCASE & FIXTURE CO., IN
700 AVALON BOULEVARD • LOS ANGELES, CALIFORN

Pacific Marine Review

Contents - - - - - - - - July, 1944

Member Audit Bureau of Circulations

Official Organ

Pacific American Steamship Association

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Shipowners Association of the Pacific Coast

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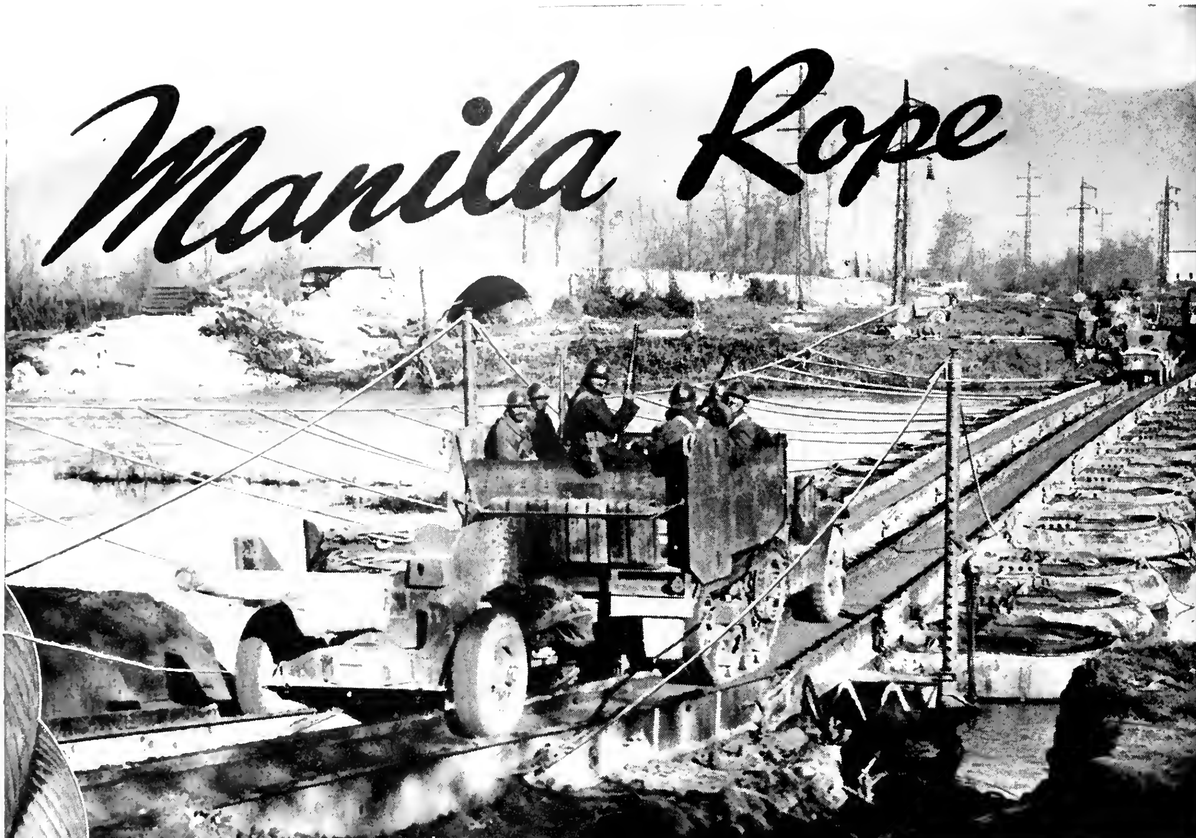
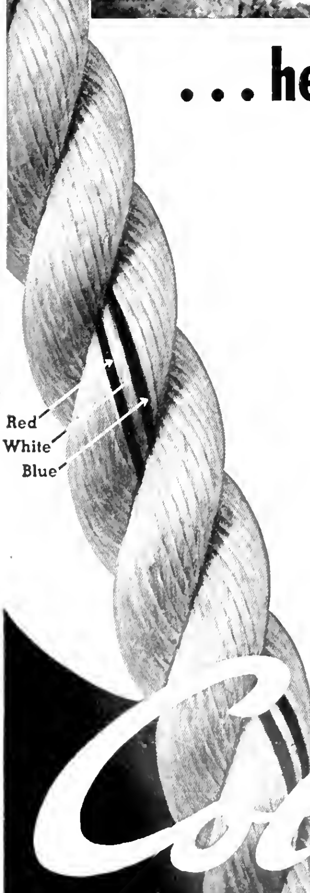
Manila Rope



...helps the Fighting French Get Across!



● To build a ponton bridge, you begin by getting a length of rope to the bank beyond. Throughout the construction, rope is an indispensable aid. And when the bridge is finished, rope is still much in evidence.

The photo shows French troops crossing the Volturno River in Italy, on their way to settle a score with the despoilers of their country, pending since the French-German armistice of 1940. Notice that each ponton is anchored with rope, and further secured by another rope laid parallel above the bridge.

Wherever our fighting men go, rope goes with them. That's why you may not at times be able to buy all the rope you want. And that's why the rope that you do have should be handled with the utmost care, for

ROPE IS A SINEW OF WAR

COLUMBIAN ROPE COMPANY
Auburn, *"The Cordage City",* **N. Y.**

ARMY E NAVY

Columbian ROPE carries the fight to the enemy!

5-Day Standardization Trials of the Bluefield Victory

Calship Vessel Makes Clean Sweep

With Rear Admiral Howard L. Vickery, vice-chairman of the United States Maritime Commission, "at the wheel," S. S. Bluefield Victory—Hull No. MCV-16—proceeded to sea off the Southern California coast June 25-29, for Victory Ship Standardization Trials.

In company with Rear Admiral Vickery and Carl W. Flesher, director of Pacific Coast Regional Construction for the Commission, a notable group of shipbuilders and engineering observers from various parts of the country were aboard as guests of John A. McCone, president of California Shipbuilding Corporation.

In the Trial Run party were Rear Admiral L. O. Colbert, director of U. S. Coast and Geodetic Survey; Lieut. William A. Weber, aide to Admiral Vickery; C. H. Johnson, engineering coordinator and technical Assistant to Admiral Vickery; Monro B. Lanier, president of The Ingalls Shipbuilding Corp., of Birmingham, Ala.; C. W. Bryan, Jr., vice president, Federal Shipbuilding and Dry Dock Co., of Kearney, N. J.; J. W. Belanger, manager of Federal and Marine Dep't, General Electric Company, Schenectady, N. Y.; W. H. Gerhauser, president, Delta Shipbuilding Co., Inc., New Orleans, La.; Commander R. R. Lukens, U. S. Coast & Geodetic Survey.

Personnel Aboard

E. R. Kauffman, chief of Trial and Performance Section, and F. E. Reed, Marine Engineer, represented the Commission's technical division, Washington, D. C. E. S. Shulters, technical assistant to Carl Flesher, of the Pacifiic Coast Regional Construction office, was also aboard.

Trial Board and Technical Assistants to D. P. Nilan, acting chief for the regional office, comprised

J. F. Gilbert, member, Trial Board
P. R. Fresia, member, Trial Board
A. L. McCasland, member, Trial Board
N. Clayborne, member, Trial Board
H. E. St. Clair, chief, Hull Plan Approval Section

Rear Admiral Howard L. Vickery at the wheel.

Left to right: C. H. Johnson, engineering co-ordinator and technical assistant to Rear Admiral Vickery; Carl W. Flesher, director, Pacific regional construction office, U. S. Maritime Commission; Rear Admiral L. O. Colbert, director of U. S. Coast & Geodetic Survey; Rear Admiral Howard L. Vickery, U. S. Maritime Commission; John A. McCone, president, California Shipbuilding Corporation; Monro B. Lanier, president, The Ingalls Shipbuilding Corporation; W. H. Gerhauser, president, Delta Shipbuilding Company; Lieutenant William A. Weber, Aide to Admiral Vickery; C. W. Bryan, Jr., vice president, Federal Shipbuilding and Dry Dock Co.; J. W. Belanger, manager, Federal & Marine Department, General Electric Company; Commander R. R. Lukens, U. S. Coast & Geodetic Survey; and A. O. Pegg, technical advisor to Operating committee, Calship.

E. L. Swain, chief, Engineering Plan Approval Section

G. S. Vaitses, chief, Electrical Engineering Plan Approval Section

W. R. Laurenson, naval architect

B. Bracht, naval architect

C. R. Elson, naval architect

R. Lowry, naval architect.

L. M. Mullen, marine engineer

W. H. Reed, marine engineer

D. E. Weatherford, electrical engineer

U. S. Maritime Commission

California Shipbuilding Corporation

J. T. Wishart, senior resident Trial Board engineer

U. S. Maritime Commission

Inspection Office at California Shipbuilding Corporation

J. Hoogerwerf, resident first senior hull inspector

H. Stern, resident principal machinery inspector

C. Petersen, resident acting first senior electrical inspector

California Shipbuilding Corporation

John A. McCone, president

A. O. Pegg, technical advisor to operating committee

D. S. Charles, acting chief engineer

C. J. Reeves, port engineer

K. T. Cederloff, staff captain

W. R. Puglisi, chief test engineer, Engineering Dept.

J. B. Moore, test engineer, Engineering Department

H. S. Hubbard, chief, Hull Scientific Department

Representative of George G. Sharp

R. Keyes, Scientific Section

Vendors' Representatives

Main Turbine — Westinghouse Electric & Mfg. Co., J. Tiefel and A. Steward.

Generators — Joshua Hendy Iron Works, E. A. Kring.

Boilers—Combustion Engineering Co., G. Lloyd and W. H. Groundwater.

Boilers—Babcock & Wilcox Co., Lawrence Rapp.

Boiler Water Testing — Dearborn Chemical Co., A. R. Guenther.

Torsion Meter Operation—Smith Erickson Energy Meter Co., F. J. Swaney and Clyde Williamson.

Joiner Work — Western Walker Co., S. C. Walker.

Data Takers

J. B. Moore	W. Harris
W. H. Lowry	A. Rogers
J. F. Petterson	P. Ray
P. Cartegena	G. Lord
R. Tebault	W. E. Hoyt
H. Seaman	W. T. Mills
M. Plaskett	C. Brosuhaus
J. R. McClure	G. Summerfelt
D.B. Aries	E.P. Moseley
A. C. Gall	H. L. Earl
C. B. Preininger	H. Marsh

United States Navy

Commander B. M. Dodson, in charge Cadet Training, Merchant Marine School, San Francisco.

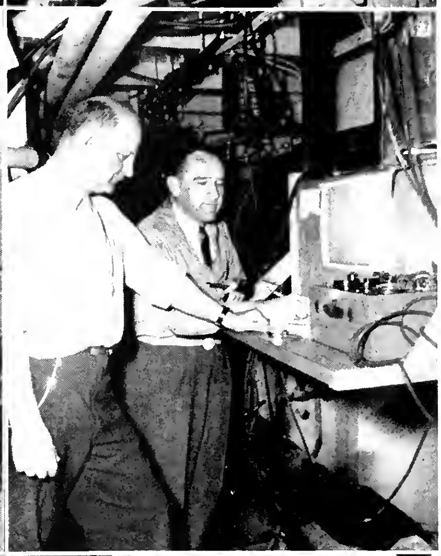
Radio Operators—H. S. Manners, C. J. Meyer, W. K. Milligan.

Signalmen—C. D. Benning, J. F. Bush, D. L. Gambill.

Mare Island Navy Yard—Ensign H. D. Ford, B. Davis.

John A. McCone (left), president, California Shipbuilding Company, and Rear Admiral Vickery.

H. Stern (left), resident principal machinery inspector for U. S. Maritime Commission at Calship, and James T. Wishart, senior resident Trial Board member.



"Broom for the Masthead!" — Admiral Howard L. Vickery and A. O. Pegg at Calship preparing to hoist the symbol of performance.

In the shaft alley—F. J. Swaney (left) and Clyde Williamson observing the Smith-Erickson energy meter, recording hp from the shaft.

Rear Admiral Vickery (left), John A. McCone, and Rear Admiral L. O. Colbert of U. S. Coast & Geodetic Survey.

Rear Admiral Vickery and John A. McCone.

The 5-Day Standardization Trial

The U. S. Maritime Commission ad designated Hull No. V-16, the . S. Bluefield Victory, as the vessel n which complete Victory Ship andardization trials would be held. These trials were the most comlete held on any commercial vessel since the beginning of the war ship building program, and the fact that this yard was selected from all other yards building Victory Ships indicates the Maritime Commission's confidence in the workmanship of the men of Calship.

These standardization trials are in addition to the regular scheduled dock and sea trials of the vessel, and are under the supervision of the Maritime Commission.

Economy, speed and maneuvering trials were conducted on the vessel at three different displacements, i. e.,

light draft, medium draft and heavy draft.

Progressive speed trials were run run over the Point Vicente measured mile course to establish reliable points from which to construct speed and power curves at the various displacements.

Trial runs were also conducted on the vessel at various horsepowers to determine the fuel economy. These runs also were made on different draft conditions.

It was estimated that five days was necessary in which to complete the runs.

Schedule

The schedule of trials were as follows: 1st Day — Light Draft. Displacement 5200 tons—

Progressive Speed Trials over the measured mile—three (3) runs each at 40, 60, 74, 82 and maximum rpm. On completion of these trials the vessel was anchored inside the breakwater and ballasted during the night to medium draft.

2nd Day—Medium Draft. Displacement 10,000 tons—

Progressive Speed Trials over the measured mile—three (3) runs each at 45, 65, 75, 82 and maximum rpm.

Maneuvering Trials: Turning circles at normal ahead power. "Z" maneuvers at 50 rpm.

On completion of these trials vessel was anchored inside the breakwater and ballasted during the night to heavy draft.

3rd Day—Heavy Draft. Displacement 14,800 tons—

Progressive Speed Trials over the measured mile—three (3) runs each at 50, 63, 74, 82 and maximum rpm.

Maneuvering Trials: Ahead steering at maximum power. Turning circles.

After completion of the progressive speed and maneuvering trials, fuel oil economy runs were held during the night.

3rd Night—Fuel Oil Economy Runs:
Two (2) hours at 2000 shp.
Two (2) hours at 4000 shp.
Two (2) hours at 6000 shp.

On completion of the progressive speed, maneuvering and fuel oil economy runs the vessel anchored inside the breakwater. Due to the time required to hold the above runs the trials on the 4th day were not started until afternoon.

4th Day—Afternoon: Heavy Draft. Displacement 14,800 tons—
Emergency Steering:
"Z" maneuvers at 50 rpm.
Emergency astern crash.
Astern operation.
Astern steering.
Emergency ahead crash.

4th Night—Fuel Oil Economy Runs:
Six (6) hours at 8500 shp.
Two (2) hours at 9350 shp.

5th Day—Used to complete all tests required which had not been held during the first two days.

Equipment Features

Among the equipment features of the S. S. Bluefield Victory are:

Westinghouse — Main Propulsion Cross compound impulse turbines: Turns 5358 rpm, reduced to 85 rpm through set of Westinghouse double reduction gears.

Combustion Engineering Co. — Boilers, operating at 465 lbs. pressure at steam drum and developing steam at 750 degrees superheat.

Todd Combustion Equipment Co. —Oil Burners.

Allis-Chalmers—Main Condenser, 2-pass surface cooling condenser; cools 57,000 lbs. steam per hour.

Joshua Hendy Iron Works—Two main Turbo Generators, Hendy turbine, with Westinghouse generator, 300 kw units.

Worthington—Main Feed Pumps, vertical simplex steam, operate at 600 lbs. per sq. in. on feed water.

Westinghouse — Main Standby Feed Pump, turbine, horizontal centrifugal.

Heat Transfer Products Co. — Evaporator.

Leslie—Reducing Valves.

Leslie Co.—"Typhon" Whistle.

Ingersoll-Rand—Main Condensate Pumps, motor-driven.

Worthington—General Service Pumps and Transfer, Worthington "duplex."

General Electric Co.—Main Switch Board.

Caterpillar — Emergency Diesel Generator, Caterpillar—Ideal 15 kw Electric Generator, switch board panel by Zinsmeyer Electric Co.

Walter Kidde & Co., Inc.—Fire Extinguishing System.

Struthers-Wells Corp. — Steering Gear, dual set pump and motor, double ram type.

Sharples—Lubricating Oil Purifier.

Bayley Blower Co. — Ventilation Fans in galley, pantry, and main deck.

Ilg.—"Portvente" port hole Ventilators.

Radiomarine Corp. of America—Radio.

G. C. Breidert Co.—Ventilators.

Westinghouse—Fourteen Electric Cargo Winches.

American Hoist & Derrick Co.—Anchor Windlass.

Morrison — " Sunroc " Drinking Fountains.

Western Walker Co.—All Joiner Work.

Bludworth—Depth Recorder.

A. Lietz Co.—Sounding Machine.

Welin - Maclachlan — Life Boat Davits.

Mackey Radio & Tel. Co.—Direction Finder.

Sperry Gyroscope Co., Inc.—Gyro-Compass.

E. H. Scott Radio Lab., Inc.—Receiving Set for standard broadcas reception.

Majestic Mfg. Co.—Galley Range

Schulhoff—Low Oil Trip Valve.

Hamel-Dahl—Tank Level Indicators, feedwater control.

Pneumercator Co.—For Lubricating Oil Tanks.

Westinghouse — Forced Draf Blowers, turbine driven.

Smith-Erickson — Energy Meter recording power from shaft.

"Air Puff"—Sooth Blowers.

Data on Victory Ship

Length	455 fee
Beam	62 fee
Deadweight Tonnage	10,600 ton
Cargo Tonnage	9,146 ton
Engine Horsepower	8,50
Propulsion Power	Steam Turbine-Gea
Decks	
Speed	15 knots +

Calship's current contracts call fo 84 Victory-type ships, of which 3 are transports. With the delivery o the S. S. Martin Johnson on May 4 1944, Calship completed its contract for 336 Liberty ships, which include 30 Liberty-type tankers. The firs Liberty was delivered on Februar 21, 1942.

Trial Responsibility

The Maritime Commission ha paid a sincere tribute to the Wester Regional Trial Board in entrusting it members with the responsibility c conducting the Victory Ship stanc ardization trials for the entire pro over the Point Vicente measure gram.

Post-War Shipbuilding

Our leading article in this issue poses the problems in absorption of surplus shipyard employees that face the Pacific Coast after the war. This article was prepared by the Research Department of the Federal Reserve Bank and, therefore, reflects the financial viewpoint in respect to this problem. That this is a very large and serious problem is acknowledged by everyone who has come in contact with it. However, it is a very evident fact that it has many and very varied aspects, and that the particular aspect which is most serious to any observer depends entirely on that observer's point of view.

The most serious questions from the viewpoint of the established shipbuilding industry are:

Will Navy and Maritime Commission contracts be suddenly canceled at the end of the war?

What will be the terms of such cancellation?

Will the Government agencies concerned sell to their managing operators any or all of the special yards designed and constructed for wartime shipbuilding?

Will these operators run these plants as commercial shipbuilding and/or ship repair plants?

What will the Maritime Commission, the U. S. Navy and the U. S. Army do with the huge post-war fleets of cargo and passenger vessels that they are now using in war and lend-lease operations?

What will be the post-war tax policy?

Assume that the Maritime Commission, which at the present writing is the world's largest merchant shipowner, and the U. S. Army and U. S. Navy, which are now among the world's largest merchant ship operators, all decide to stand by the Merchant Marine Act and return the ships to American private ownership when the war is over.

The number of ships involved is such that American private ownership and normal American commerce have not enough capacity to absorb them. Fortunately a very large block of these ships are of such construction and speed that they are not suitable for the great majority of American trade routes. We refer to the Liberty type. Much thought has been given to the problem of using the Libertys under the American flag in normal commerce. Proposals run all the way from subsidized tramp services to huge fleets of Libertys laid up for us in a possible future war.

It seems to this writer that the sensible thing to do with the Libertys is to sell them on the world's market to tramp ship operators, who will be very hungry for ready-for-sea tonnage. The Greeks, the Dutch, the Danes, the Swedes, the Norwegians, the British, the Chinese and the Russians, can all use these ships in tramp services under their shipping laws. Such use would be impossible commercially under American shipping laws and labor conditions.

The ships of this class that cannot be sold should be scrapped. Liberty type vessels are obsolete now and would be practically useless after a lay-up of ten to fifteen years, even under very expensive maintenance programs. Would it not be far better to initiate and maintain a sensible program of building up-to-date vessels for commercial use and possible future war service?

With the Libertys out of the way and the private operators given a fair opportunity to maintain reserve funds against replacement building, the commercial shipbuilding industry of the United States would be able to take care of itself very nicely.

Such a program will inevitably involve a period of readjustment immediately following the war. However, in the case of the established commercial shipyards, this period will be full of great repair, reconditioning and conversion programs. And it is our conviction that all yards that are prepared to take contracts for that type of work will be very busy for several post-war years.

There is also, in the world shipbuilding picture, considerable hope for new contracts for American shipyards. In the past much of the work initiated in countries having no shipbuilding plant has gone to such countries as Great Britain, Germany, Holland, Italy and Scandinavia. All of the shipbuilding plants in all of these countries will be busy for several years building up their own merchant marine and will be unable to take, or at least not keen to get, foreign orders. So we may look to see much foreign interest in any American yard with idle ways.

This does not, of course, solve the problem of surplus shipyard labor. In that connection a rather pertinent fact was brought to our attention recently by a railroad executive, viz., that the most critical shortage now existing in America is the shortage of common labor. The war programs have taken practically every laborer in the United States and, after training him a few weeks, introduced him into war industry in one of the craftsmen categories formerly known as "skilled labor." So we have lost the common labor without really producing skilled labor.

The inevitable economic result, as soon as commercial operation is resumed, will be the return of hundreds of thousands of these hastily-trained workers to the unskilled labor categories.

There are also in war industries hundreds of thousands brought in from the service work of the nation—clerks, "soda jerkers," cleaners and pressers, laundry operators, gas station attendants, typists, workers in all the services declared "non-essential" in wartime but none the less vitally essential to our normal economy.

A San Francisco Bay shipyard at night.

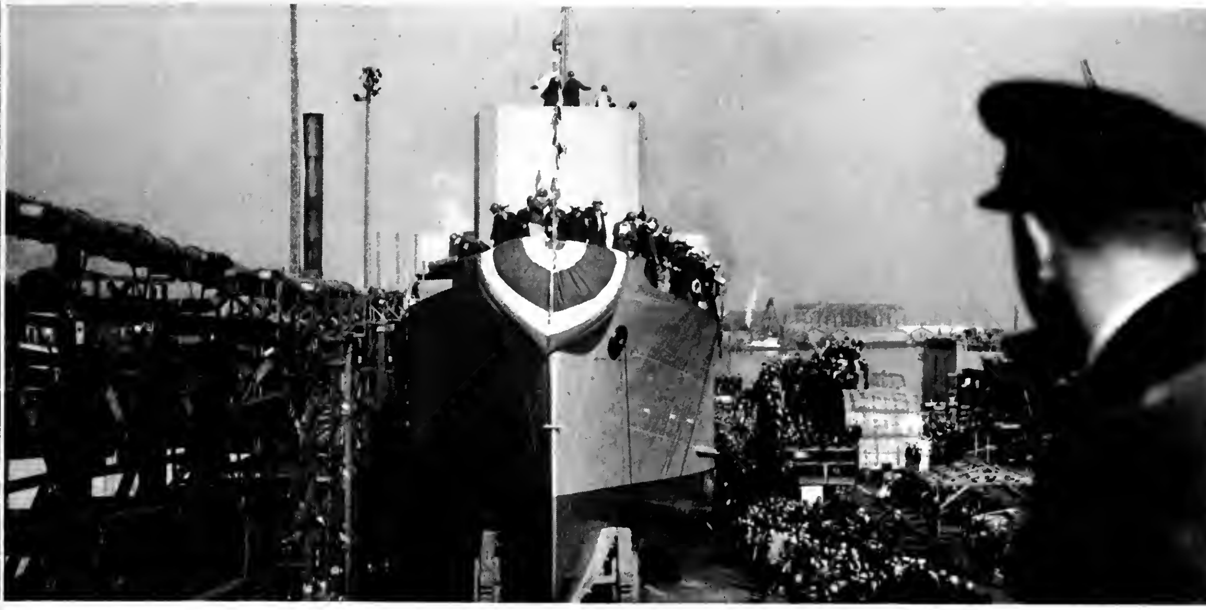
Below: Forepeak of a Victory ship swinging into place against the blue sky of Southern California.

Shipbuilding

ALTHOUGH the level of actual operations has not yet been generally reduced, recent cancellations, cutbacks and shifts to other regions of contracts held by Pacific Coast shipyards have raised the question, perhaps somewhat earlier than had been anticipated, of the ultimate adjustment in employment of personnel and utilization of plant facilities which must be expected in this region as an aftermath of the war. From its wartime position as the District's number one employer, shipbuilding will probably be faced with a more drastic reduction in volume of production and employment than any other industry in the coming transition to peacetime conditions. The anticipated reduction in shipbuilding will, moreover, affect not only the shipyards and their employees but also many plants and thousands of workers in other industries. Everyone is familiar with the fact that wartime shipbuilding activity on the Pacific Coast has given employment to several hundred thousand persons, many of whom had never seen a shipyard before taking their new jobs. Not everyone, however, realizes the extent to which shipbuilding has stimulated the development of other industrial activity on the Pacific Coast.

(Text is adapted from the "Monthly Review," Federal Reserve Bank of San Francisco.)

Until the outbreak of the war, the heavy metals and metal-working industries were relatively undeveloped in this region. The Western states depended upon outside sources for much the greater part of their normal requirements for steel, machinery of practically all kinds, agricultural implements, and motor cars. The Western steel industry was small and produced largely the lighter types of rolled products. With very few exceptions, foundries, forges, and machine shops were small and localized. Automobile production was limited to assembly in a few plants on the Pacific Coast. Facilities were not available on this coast to produce more than a negligible part of the materials and equipment required in ship construction on the scale necessitated by the war shipbuilding program. The lack of sufficient capacity in Eastern steel mills to meet war - expanded demands, together



A mine sweeper launching on Puget Sound.

and the Pacific Coast

with pressure upon overland transportation facilities, has led to a tremendous expansion in iron and steel capacity, in foundry and forging facilities, and in marine engine building in the District.

Outside sources still provide the greater part of the material and much of the equipment going into ships built on the Pacific Coast. However a substantial volume of both prime and subcontracts have been placed in the West with others than shipbuilders for steel plates and shapes, castings and forgings, boilers, propulsion machinery, auxiliary engines, steering gears, pumps, valves, winches, and other items, and for joiner work, machining and repair of parts, and prefabrication of sections. Almost all of these items of material and equipment were for vessels to be constructed in this region, though some engine-building and castings work were destined for shipyards on other coasts.

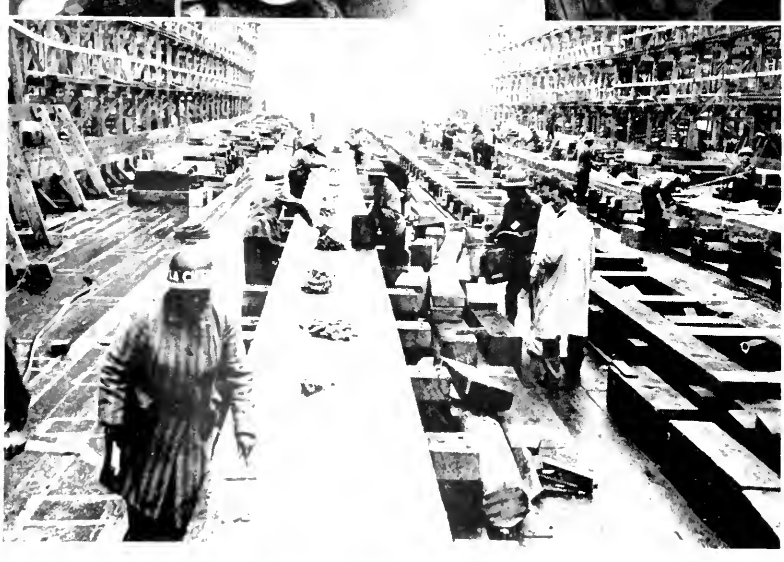
The expansion of these plants has been predicated to a large extent upon a market created by Pacific Coast shipbuilding. When ship construction is curtailed, they will be faced, along with the shipyards themselves, with the alternative of finding new markets or shutting down. The nature and scale of their activities are in large measure new to the District; some will be able to return to their pre-war activities and customers, but a much higher level of industrial demand for Western metals and metal products than existed before the war, or than would have been expected in the next decade in terms of pre-war rates of growth, will have to be attained if extensive shutdowns are not to occur.

Expansion in Shipbuilding

The rapid and spectacular expansion of shipbuilding activity on the Pacific Coast since 1941 has produced a highly unbalanced condition in the Western economy. Together with the parallel inflation of aircraft manufacture in a few specialized centers of production, it has created an artificial and lopsided concentration of employment and population in the principal industrial areas.

Under the spur of war requirements, shipbuilding and aircraft production in the Pacific Coast region have attained fantastic proportions, judged by pre-war standards of comparison. The total value of contracts placed with 200 West Coast shipbuilders since June, 1940, approximates seven billion dollars, while the Pacific Coast aircraft industry is responsible for contracts aggregating nearly eleven billions. The number of persons employed by these two industries in the leading metropolitan areas of the District at the peak in 1943 was nearly double, and is currently about 75 per cent above the total number of all manufacturing employees in the District in 1939.

From an industry employing not more than 10 or 12 thousand persons during the decades 1920 to 1940, Pacific Coast shipbuilding has grown within the space of three or four years to a point where more than 600,000 people are currently employed in some 200 plants from Bellingham to San Diego. Probably well over 100,000 others are employed in such ancillary industries as steel



Shipyard labor on the Coast has been recruited from all walks of life.

works and foundries, machine shops, forging and engine-building works, and prefabricating establishments. At least one-half of these represent a net increase occasioned by the impact of demand for materials and parts required in the war shipbuilding program. A large pool of industrial labor, a considerable proportion of whom had had no previous training or experience in industry, has been created in this region. Many workers may be expected to migrate outside the District when the war boom is over. Others, particularly women, of whom nearly 100,000 are currently employed in Pacific Coast shipbuilding, will probably drop out of the labor force. The District labor force will retain large numbers, however, whose war training in industrial occupations is a potential asset to the community.

Growth of Related Industries

To a much greater extent than in the older industrial regions, shipbuilding on the Pacific Coast, especially in the large new yards constructing standardized vessels for the Maritime Commission, is an assembly operation rather than a strictly manufacturing process. Mass production is the rule, with emphasis on rapid prefabrication and assembly of large units or sections of hull and superstructure. A maximum of welding is employed both in prefabrication and in final erection of the sections into the ship's structure on the building ways.

Boilers, propulsion machinery, shafting, steering gears, auxiliary engines, pumps, and valves are procured from outside sources, together with masts, booms, cargo hoists, winches, anchors, propellers, and a great variety of miscellaneous castings and equipment. This has made possible the extensive utilization of relatively untrained labor rather than experienced shipwrights in much of the routine work of shipbuilding.

It has also required the parceling out of supply contracts among a large number of concerns. Up to the end of 1943, prime contracts involving $50,000 or more for materials and equipment used in shipbuilding had been placed by Government procurement agencies with some 380 concerns located in forty-five counties

Pipe storage in a San Francisco Bay shipyard. A tanker is at the outfitting dock in the background.

hroughout the Pacific Coast and In-ermountain states.

The shipyards themselves have also ›laced a substantial volume of sub-ontracts for various items of equip-nent, as well as for a considerable mount of prefabrication and car-›enter work, most of which has been lone by local firms. In March of this ear, the Mare Island Navy Yard, vhich farmed out little or no work ›rior to the war, had about 190 prime ontractors and more than 300 sub-ontractors in California, Utah, Colo-ado, and Wyoming. These firms em-›loyed some 25,000 persons.

The requirements of the Pacific Coast shipyards for steel alone have ›robably averaged 3,000,000 tons a ear over the past two years, a quan-ity far in excess of the productive apacity of the Western steel indus-ry, particularly in the critical items of plates and heavy shapes, for which olling capacity was practically non-xistent in the West at the beginning f the war. The pre-war Western teel market had called for a great ariety of miscellaneous steel prod-icts rather than large quantities of ny single type of finished steel; the ›cal mills had limited themselves to he lighter types of product, such as heets, reinforcing bars and light hapes, wire, and tin plate, and no eally heavy steel products were olled west of Colorado. Eight or ine local mills, having an aggregate olling capacity of l·ss than a million tons of finished products per year, produced about one-third of the total steel consumed in the District.

With the placing of large-scale contracts on the West Coast for emergency ships early in 1941, it was realized that bold and energetic meas-ures would be necessary to supple-ment the shipments of steel that could be expected from Eastern mills, par-ticularly in view of the cessation of intercoastal shipping via the Panama Canal and the prospect of long de-lays in delivery by the overburdened rail carriers, to say nothing of the limited facilities of the steel indus-try as a whole for producing heavy ship plates.

After several false starts and many delays, an entirely new Western steel industry has now been created, centering in the two modern and completely integrated plants at Fon-tana, California, and Geneva, Utah, which represent an investment of public funds approximating 300 mil-lion dollars. These plants have been designed to roll types of product, notably heavy ship plates, hitherto beyond the scope of Western steel mills, and were intended to supply material for the Pacific Coast war shipbuilding program.

The Fontana plant rolled its first steel plates in August, 1943, and at-tained an output of 31,000 tons per month in March, 1944. The rated capacity of this plant is 300,000 tons of plates and 170,000 tons of struc-tural shapes and bars per year. The Geneva plant was designed for an annual capacity of 700,000 tons of plates and 200,000 tons of structurals and semi-finished products. This mill rolled its first steel plates in March, 1944, and was scheduled to deliver 20,000 tons of plates to Pacific Coast shipbuilders in May. With an esti-mated annual requirement of around 2,500,000 tons of hull steel (plates, shapes, bars, etc.) at current rates of production, it is evident that Pacific Coast shipbuilding demand for steel continues to exceed the capacity of the Western steel industry, including additional facilities installed by sev-eral of the older plants for the types of products required in shipbuilding.

Total steel ingot capacity in the re-gion west of the Rockies has been in-creased from around 1,100,000 tons in 1941 to well over 3,000,000 tons in 1944. About four-fifths of the to-tal increase is represented by the two new plants at Fontana and Geneva, but important additions have also been made to steel-producing capaci-ty at established plants, both in fur-naces and finishing facilities. The fol-lowing tabulation indicates the esti-mated steel ingot producing capacity in the District in 1940 and 1944 (in thousands of net tons):

	1940	1944
Northern California	600	800
Southern California	300	1,050
Washington	170	240
Oregon	.....	30
Utah	.....	1,280
Twelfth District	1,070	3,400

Pacific Coast shipyards launch them night and day. Here is one about to slide down the ways.

The foundry and forging industry of the District has experienced a similar expansion in productive capacity during the past three years. Prior to the spectacular development of shipbuilding which began in 1941, the Western foundry industry had been restricted to a relatively small market. The few large plants depended upon the railroads and car builders as their chief customers, with an occasional order for a large casting from a hydroelectric power or water supply company. The largest of these, located at Pittsburg, California, was itself a legacy from the shipbuilding effort of the last war.

The demand of the current shipbuilding program for heavy steel casting for stern frames, rudder stocks, propeller tubes and struts, anchors, hawsepipes, and other items has brought an extensive business to heavy steel foundries, and a very considerable expansion in capacity has resulted. Between June, 1940, and September, 1943, approximately 25 million dollars was laid out by some 40 foundry and forging concerns in enlarging their plant facilities, chiefly for the production of ship castings and forgings. In addition, the largest foundry west of the Mississippi has been completed recently at Pittsburg, California, for the Defense Plant Corporation.

Marine engine building, of both steam and diesel types, has also been very greatly expanded as a direct consequence of the war shipbuilding effort. The diesel engine industry was well established and was regularly supplying marine engines for fishing boats and tugs. Under the war program, large numbers of diesels have been turned out for mine sweepers, landing vessels, tugs and other small craft, as well as for auxiliary engines and generator units for larger vessels. Considerable numbers of standard gasoline motors have also been produced for sub chasers and patrol boats of various kinds.

One of the most spectacular examples of the wartime development of engine-building in any part of the country is the large-scale construction of reciprocating engines for Liberty ships by two enterprising firms on the Coast. While including various types of design in its West Coast construction program, the Maritime Commission has since 1941 concentrated very largely on the so-called Liberty ship. Nearly 1,200 of these emergency vessels have been constructed by Pacific Coast builders, and the engines for approximately 1000 of them have been built in California and Oregon machine shops. One of these engine builders is now embarked on a large turbine engine program to supply propulsion equipment for C-3 and Victory type ships, currently under construction by Pacific Coast shipyards.

More than any other industry, shipbuilding has been responsible for the vast increase in population and employment on the Pacific Coast since 1940, and its demand for materials and supplies has been the principal factor responsible for the rapid expansion and development of heavy metals and metal-working industries. The current position is still generally one of urgent demand for shipyard services, both in construction and repair work—with consequent pressure upon the miscellaneous range of industries supplying materials, parts and equipment to maintain or even increase their output. When this pressure relaxes, as inevitably it will, new problems will have to be faced. In this region, a new set of industrial facilities has been created and an additional labor supply recruited and trained on the job. The problem here is not one of reconversion to previous use, but rather one of finding new markets and alternative uses for the industrial labor and equipment which have been superimposed upon the previous industrial structure.

WHILE DESTROYERS, ne greyhounds of the fleet, were vinning themselves an envious reputation during World War I, Navy nen dubbed them with the almost anderous name of "tin cans." A recent trial trip aboard one of the new nips from the yards of the Todd acific Shipyards Inc., formerly Settle-Tacoma Shipbuilding Corporaon, proved to every man aboard nat it just simply isn't so.

Even though they don't boast the eavy shell plating worn by their najestic sisters, the "capital ships" f the fleet, they are, in the opinion f the men who sail and fight them, the toughest, hardest-hitting ships f their size afloat."

At the start of a trial run the razor row of the untried ship edges away rom the long outfitting dock, her win screws slowly chopping the reen waters of Puget Sound — the irthplace of many staunch seagoing eadaches for Hitler and Tojo. The vaters of the sound, which first reeived the sleek vessel as it slid down ne ways, are ready to bear it over ne tortuous route of what will peraps be the toughest day's sailing to vhich the gleaming hull will ever be ubjected.

Before the end of the day the ship, ne trial crew, and the guests aboard vill know whether she's ready to go nto battle as a new bit of handilored hell fit to chase enemy ships rom the sea lanes of the world.

E. B. Colton, Todd Pacific general nanager, is in charge of the trial run. He watches with intent interest as ne turbines quiet down to a whisper nd anchor chains rattle their way ver the side. The heavy hook is ropped 30 fathoms, then stopped vith the hand brake to test the rake's ability to stop the chain with a certain number of feet.

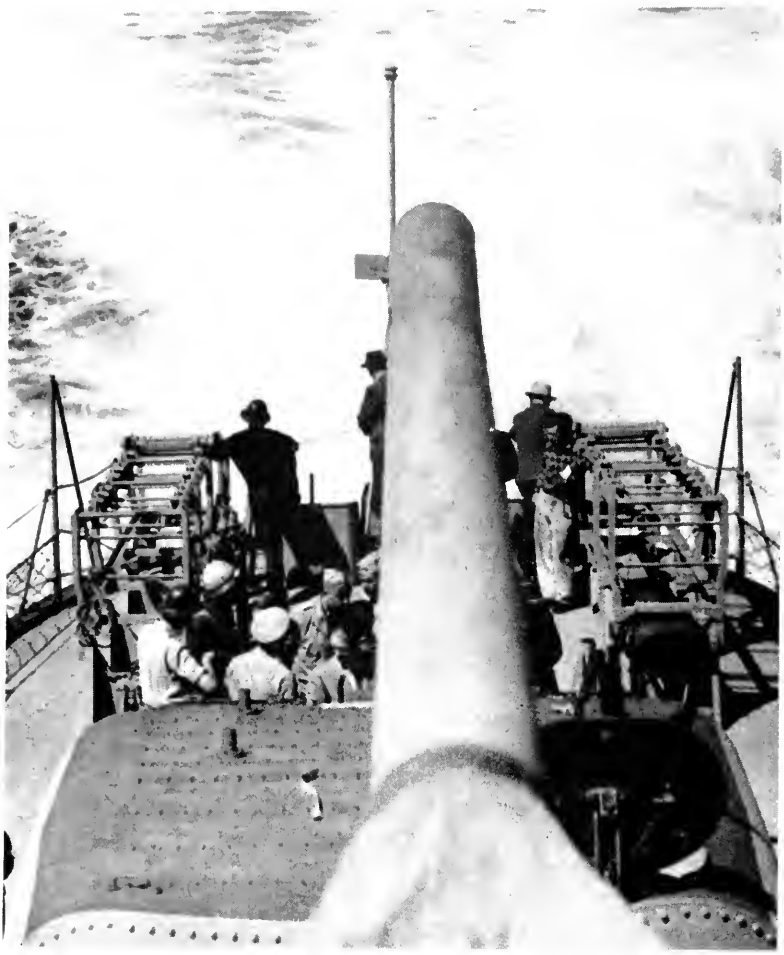
This anchor test is followed by nore than 250 tests of operating gear nd armament—tests covering everyning from the pilot house windshield vipers to the gun turrets with their eadly five-inch rapid-fire guns. Nothg escapes the rigid examination of ne experts.

When assured that the ship is eady for it, the members of the trial oard call for the sustained speed un. Orders pass from the wheelouse to the engine room. The speed ndicator needle starts to crawl round the dial, passing figure after

This graphic photo was taken from a Coast Guard aircraft crash boat—a boat noted for speed, but one which had all it could do to keep ahead of the bounding destroyer as it settled down to its full speed.

SEA-TAC DESTROYERS Can take it!

figure. The prow knifes through the water and soon the ship has a curving white bone in its teeth — a bone it is anxious to chew over with the fleets of Japan and Germany. At the stern of the ship the deck seems to sink into the trough carved by the sleek hull, and the flashing propellers



Trial-runners watch with interest as the stern of the ship nestles into the trough, and wonder how soon they will have to move forward to keep their feet dry.

An unidentified sailor, already a veteran, takes advantage of a sunny spot on the after deck to write a letter home while the destroyer builds up to full speed.

shred the green waters into violently tossed bits of white foam.

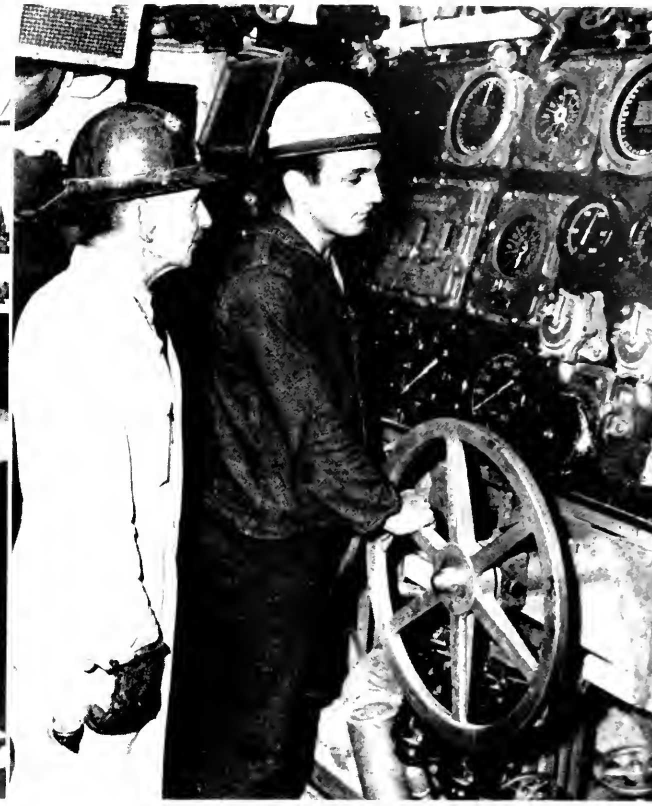
The speed grows until the needle finally quivers and holds itself steady at a figure that a landlubber finds hard to believe. It just doesn't seem possible that such a mass of carefully molded steel plate can be pushed through the water so fast, even knowing that it is flung along by 50,000 horsepower. Although this speed figure cannot be disclosed, it promises to be a shocking surprise to fleeing enemy ships when this new destroyer starts out in hot pursuit.

From the engine room the noise of the turbines comes up in a strong, shrill whine which couples itself with the crisp hiss of protesting water curling sharply away from the insistent steel prow. The deck seems to come to life and seems to be trying to convey its proud message to the soles of your feet as you stand looking at the growing mountain of water off the stern.

Then all hands grab for support. The mast swings crazily against the sky, and the ship heels sharply over in a full rudder turn. Then it heels over to the opposite side and the ship completes a "figure eight," a maneuver which may come in mighty handy when she dodges enemy bombing planes. Without warning, the ship loses way for a moment and then everyone feels the sudden force of inertia pushing him still forward, while the entire hull vibrates and quivers with the propellers churning full speed astern. Every piece of metal seems to do its utmost to shake off the overwhelming force of the huge power plants, and then becomes silent and gives in, moving backward following the spectacular crash stop.

Tension, which had been evident in every intent face, falls away like a mask at midnight. All hands know that they are privileged to be aboard one of the finest fighting ships ever built. Everyone nods and grins. "She's done a swell job," they say to each other, and the ship turns again, and with her proud head held high she slips back down the length of the sound to the pier as the witch's broom bobs proudly from the mast. Another clean sweep for Todd Pacific!

No, nothing even remotely related to a "tin can" could have performed so proudly for its builders.



Upper left: It's a mighty proud moment for Lieut. Comdr. D. M. Coffee, Commanding Officer, as he feels his new ship respond to the power of its whirling turbines.

Upper right: H. Kennedy, trial engineer, and D. E. Randles, Machinist's Mate First Class, maintain a careful watch over instruments on the engine room control panel.

Right: Officials in the pilot house watch anxiously as the speed indicator creeps up the dial. Left to right they are: W. W. Hamilton, testing engineer; C. J. Anderson, supervisory inspector; L. H. Jotsenpiller, electrical foreman; John Murphy, helmsman; Lieut. Comdr. D. M. Coffee, Commanding Officer; and Lieut. Comdr. A. V. R. Watson, Resident Navy Inspector.

The hospital ship U. S. S. Comfort.

U.S.S. COMFORT
a Ship of Healing

CHARGED with a mission of mercy, the U.S.S. Comfort, built at Los Angeles Harbor, is on active duty today somewhere on the high seas—the first hospital ship to be manned jointly by Army and Navy personnel.

The hull of the big white ship, a converted C-1 passenger and cargo vessel, was built by Consolidated Steel Corporation at the Wilmington yard and launched on March 18, 1943. The vessel was completed late in May, 1944, at the Bethlehem yard. She is the third hospital ship launched by Consolidated, and has a cruising speed of 14 knots.

This steamer is a floating hospital, with all the conveniences a patient would find in a hospital ashore. Her mission is to transport sick and wounded from battle zones.

The Army is charged with providing medical attention for her load of patients, while a Navy crew has responsibility for the operation of the ship herself. This division of duty was never tried out before, but will be used on other ships of the Comfort's class.

It worked excellently, Eleventh Naval District officials declared, during the Comfort's series of trial runs, which took place in Southern California waters beginning on May 29.

Commander H. F. Fultz, U.S.N., of Winchester, Mass., is captain of the ship, with 23 officers and 270 enlisted men under his command. The Army medical detachment—55 officers and 154 enlisted men—is commanded by Lieut.-Col. Joseph F. Linsman of Omaha, Neb.

Painted a gleaming white, with a horizontal green stripe the length of the ship on either side, the ship bears red crosses in the middle of both sides, as well as on the deck and stack, to emphasize her non-combat function. She will sail fully illuminated at night with special lights flooding the distinguishing marks on her deck and funnel.

As is further provided by the Geneva Convention, she will carry no weapons of any kind.

Within her hull are 500 compartments, containing beds for 700 patients and as complete an array of medical facilities as would be found in the largest institutions on land. They include operating rooms, dental clinic, diet kitchens, X-ray and physiotherapy rooms, and laboratories.

The medical department has a staff of nine physicians, two dentists, one sanitary corps officer, 37 nurses, one dietitian, and 154 enlisted men. Two American Red Cross workers, designated as hospital staff aids, will help Army personnel in providing for patients' comfort and welfare.

Another unique feature of the ship is her carrying both an Army and a Navy chaplain (one a Protestant, the other a Roman Catholic), each of

Officers of the ship. Left to right are: Comdr. H. F. Fultz, captain; Lieut. K. M. Giles, executive officer, U. S. N. R.; Lieut. J. R. Eustis, navigator, U. S. N. R.; Lieut. L. B. McKellor, communications officer.

Army, Navy and medical personnel at inspection on deck.

(Continued on next page)

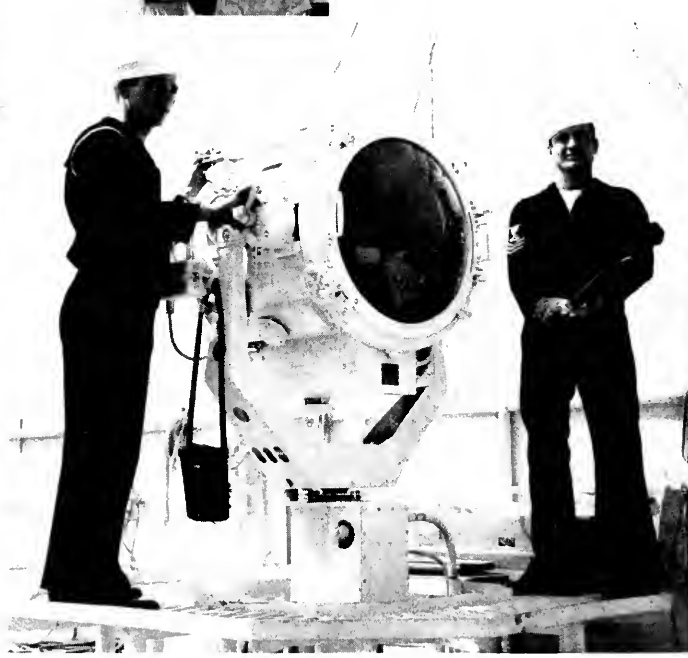
THE HOSPITAL SHIP COMFORT

(Continued from preceding page)

Unloading a stretcher case from a lifeboat to the hospital ship.

In the operating room.

Below: Signaling searchlight platform.



whom will conduct services for men of his faith in both crews.

Provided for the comfort of the patients are lounges, a sun deck, motion picture facilities and a library. The projection booth is incorporated in the after part of the superstructure, with the screen on the stern, making much of the after deck space available for seating.

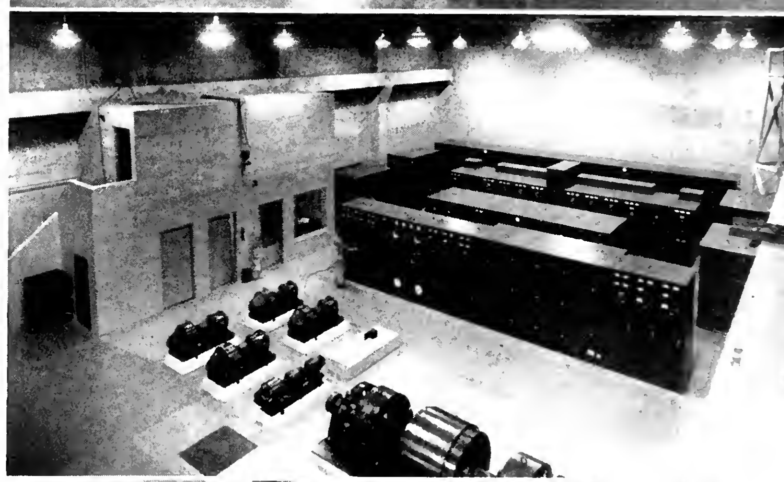
A record player and a [illegible] selection of recordings were presented to the ship by the men and women who outfitted her.

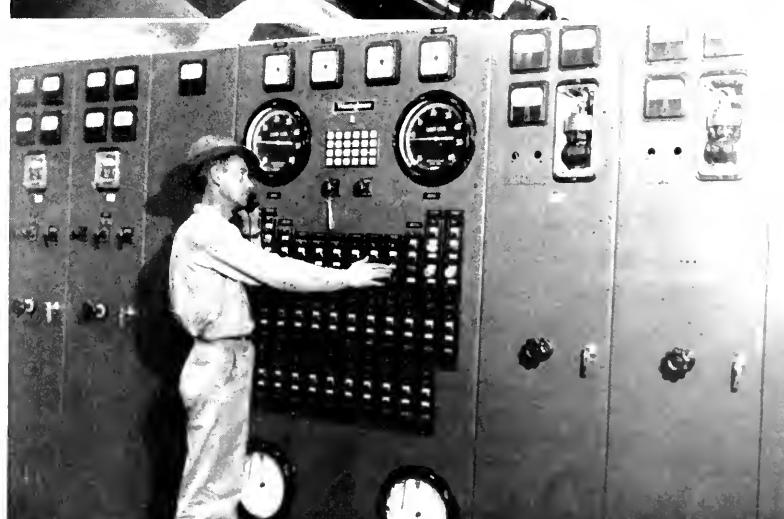
Unit Switchgear for Naval Drydocks

Substantial savings in critical materials, man-hours and money resulted from the recently completed installation of metal-clad unit switchgear at the Naval Operating Base, Long Beach, Calif., reported to be one of the most effective, flexible and largest installations of its kind in the West. Designed to handle a large block of power, which is supplied for a great variety of purposes, most of the switchgear and transformers were supplied by Westinghouse.

Control of this power to operate pumping and other equipment used principally at the drydocks on the base is accomplished at several load centers adjacent to final power consumption points. Incoming electric power at 11,500 volts, alternating current, is distributed at 4800 volts and 480 volts through several 1500-kva three-phase Westinghouse air-cooled transformers. Smaller transformers, rated at 150 to 450 kva, step down 480-volt power to 120/208 volts for lighting circuits.

Required switching functions are accomplished very effectively by arrangements of standard metal-clad units, the use of which eliminated the need of much design engineering, special foundations and masonry cells, and hence resulted in substantial savings. All stations are equipped with removable type De-ion circuit breakers, either of the draw-out or vertical construction—a feature which permits easy inspection and assures maximum continuity of service.





Top of page: Compressed air for air-driven winches, testing tanks and boilers, air guns and other equipment used to repair ships in drydock at the recently completed Naval Operating Base, Long Beach, Calif., is supplied by these Chicago Pneumatic Tool Co. compressors. These compressors, rated at 110 pounds pressure per square inch, deliver 2700 cubic feet of air per minute and are driven by 500-horsepower Westinghouse synchronous motors operating at 180 revolutions per minute.

Center: This interior view of a substation at the base shows how metal-clad switchgear affords the maximum saving of space, and—because it is completely sectionalized—enables safer operation. At the left and right of the central switchgear panels may be seen Westinghouse 1500-kva three-phase air-cooled transformers. These transformers handle power distribution needs of the base, and a 450-kva unit, not shown in the photo, serves lighting installations.

Bottom: An operator at the central power control station in a substation at the base. From this board, part of one of the largest installations of Westinghouse metal-clad switchgear in the West, the operator can regulate the operation of pumps, and control power used for equipment to repair ships in adjacent drydocks.

Wrens in certain harbors and waterways are now replacing sailors by manning tenders, ferryboats and small craft. Naval bell-bottomed trousers have been issued to those with special outdoor duties. The picture shows a craft approaching the jetty, coxswain slowing down as the Wren aft prepares to throw the line for making fast.

Girls Prove Able Seamen

By Kathleen M. Palmer

Since the inauguration of Women's Royal Naval Service Boats Crews, these daughters of Britain have so proved their ability to handle boats in all weathers and circumstances as to make themselves virtually indispensable to the Royal Navy.

A commander of a submarine depot ship in northern waters around Britain, appreciating the value of these crews, and having all facilities for their training at hand, has organized a course of instruction for Wrens training in this category. It is both practical and theoretical. Navigation classes are held in the schoolroom of the depot ship, where the Wrens learn the elementary theory of navigation, learn to understand buoyage systems, how to read a chart and lay off a simple course; instruction in the wheelhouse on boxing the compass, helm orders and the rule of the road at sea follows. On the signal bridge, by use of an instructional box, the crews learn from a Signal Officer the naval code, so that they are able to understand signals from the depot ships when they are under way. They also learn to signal in Morse with small lamps, and in semaphore, at the rate of some ten words a minute.

Their petty officer instructor supervises practical knotwork on the jackstay, as naturally these girls must be able to make bends and hitches in all weathers, day or night, summer or winter, without fumbling and hesitation. They also receive instruction from him with lead and line.

For training in boat handling, the potential Wren crew are taken away in a launch with a naval leading seaman in the bow and an ordinary seaman in the stern to teach the girls how to handle the boat. After two days the ordinary seaman is taken off, leaving the leading seaman to act as coxswain. The Wrens carry out the various duties in turns until one particular Wren is selected by the instructor to be the permanent coxswain, and is given her crew, with whom she will work regularly.

Crews in training are based on the depot ship when on duty, returning to Wren quarters ashore for sleeping. On being called away by the bos'n's mate, they man their boat in 30 seconds from the quarter-deck, climbing down the ladder on the ship's quarter, onto the quarter boom and down the jumping boom ladder and into the boat. The return to the quarter-deck, when a boat comes alongside, is made via the same route.

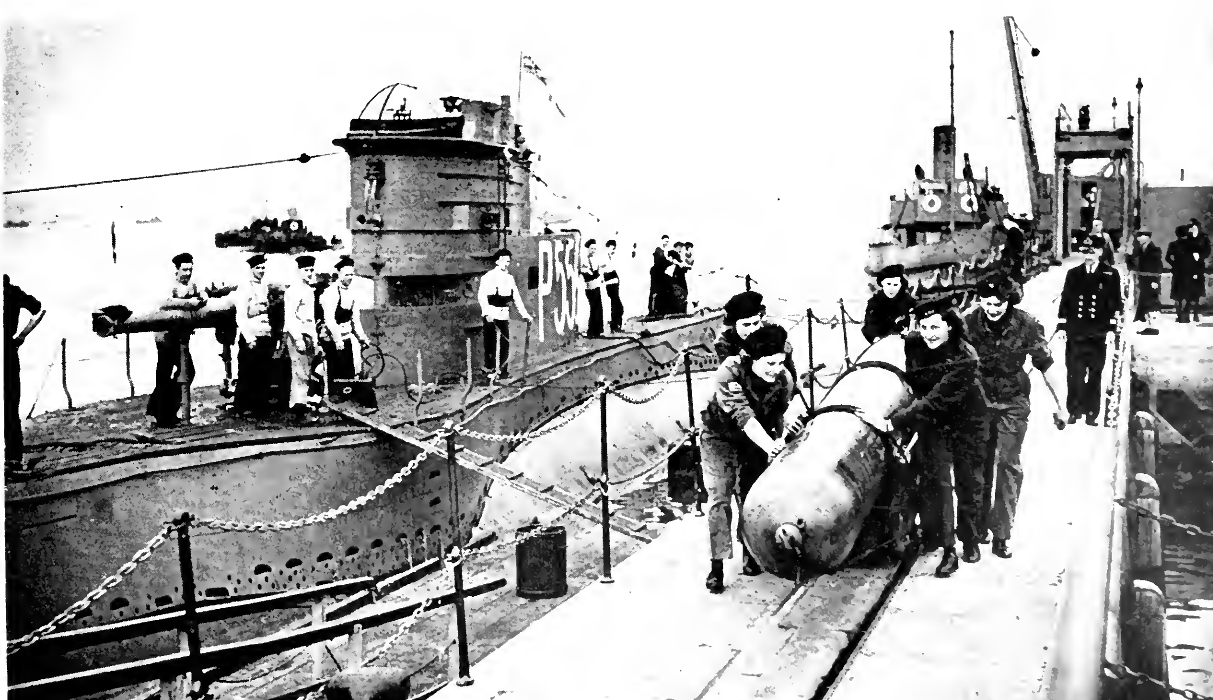
The crews are entirely responsible for their own boats, which they scrub out every morning with scrubbers, mops, swabs and soap. Between routine trips, which include landing the captain from the depot ship, collecting stores or the wardroom laundry, or picking up liberty men, they polish up their brass work and wipe down their spray screens.

Each morning the Wren Ships Company is mustered for physical training on the quarter-deck by a Naval P.T. Instructor, and the girls become efficient in rope climbing. Their summer rig consists of white cotton flannels, worn with reefers and bell bottom trousers, with their distinctive white lanyards. They have knives attached to the lanyards for use in emergency.

The length of training for these crews varies according to the previous experience of the ratings, and may be from as little as six weeks to two and a half months for crews who have had no experience at all. When fully trained they are drafted to other naval bases, where they man the naval hospital boats, diesel launches and various types of craft used as duty and liberty boats.

(Article and photos courtesy British Information Services. The author is acting editor of the British journal, "Yachting Monthly.")

Upper left: Maintenance Wrens maintain small arms up to 3-pounder Hotchkiss for all types of small craft. Known as Q. O. (Quick-firing Ordnance) Wrens, these girls board the boats as soon as they come in after an operation to strip and clean the Lewis guns and 0.5 Vickers machine guns. Upper right: Small arms, pistols, small guns, etc., are taken ashore for cleaning. Below: Wrens at a naval base work on torpedo maintenance, a job that in former years tied many would-be fighting men to bench and workshop. Here a torpedo is shown being wheeled out for loading in a submarine shortly due to leave on patrol.



A Remarkable Anchor Test

3000-lb. Danforth as used in A. B. S. Maritime Commission test. (A 60,000-lb. Navy stockless would be required to equal the average holding of this anchor.)

During the pas[illegible] Pacific **Marine Review** h[illegible] to notice the developm[illegible] ble anchor designed [illegible] S. Danforth, a promi[illegible] cisco engineer and yac[illegible] anchor, as frequently rec[illegible] columns, has shown very extraordinary holding power when subjected to tests by local towing launches and tugs.

It has come into wide use by the U. S. Navy and the U. S. Army for various auxiliary vessels, such as landing craft and rescue boats. The aviation industry, recognizing the value of such strong holding power in lightweight anchors, is adopting the Danforth anchor for seaplanes.

Anchors for merchant marine vessels are specified by weight according to an old rule based on experience with conventional anchor forms. R. S. Danforth has, therefore, sought an opportunity for a comparative test of his anchor against a heavier conventional anchor—a test with a sufficiently powerful tug, and to be carried out in the presence of the officials of the U. S. Coast Guard and the representatives of the American Bureau of Shipping.

An opportunity for such test presented itself through the availability in San Francisco Bay of the U. S. War Shipping Administration's deep-sea tug Cabrillo, a tug that will develop approximately 3000 horsepower with her two Enterprise diesel engines, and that is equipped with a well-designed towing propeller and Kort nozzle so that she can transform a large part of this power into forward thrust at low speeds.

Using this tug, tests to compare the holding ability of a 3000-lb. Danforth anchor with a 6000-lb. Navy stockless were conducted recently on San Francisco Bay. These tests were witnessed by W. B. Warren, principal surveyor of the American Bureau of Shipping's Pacific Coast office, and by representatives of the U S. Maritime Commission and of George C. Sharp, naval architect.

The tests demonstrated that the 3000-lb. Danforth had from seven to twelve times the holding ability of the 6000-lb. Navy stockless.

The tests were conducted at the eastern end of Naval Anchorage No. 12, south of Yerba Buena Island, San Francisco Bay. The bottom here consists of fine, soft gray or black sand. Measurements were made on the electrical stress link illustrated, which was developed and operated by experimental officers from the U. S. Naval Net Depot at Tiburon, California.

This link consists of a three-and-a-half-inch-diameter steel bar with half links welded to each end, Baldwin-Southwark SR-4 strain gages cemented on each side, together with two additional gages for temperature compensation mounted on a strip of metal not under strain.

The gages are enclosed in sections of three-inch pipe so that the stress link is waterproof. The change in resistance of the strain gage under stress is measured by the SR-4 strain indicator, readings of which give direct values in micro inches strain per inch.

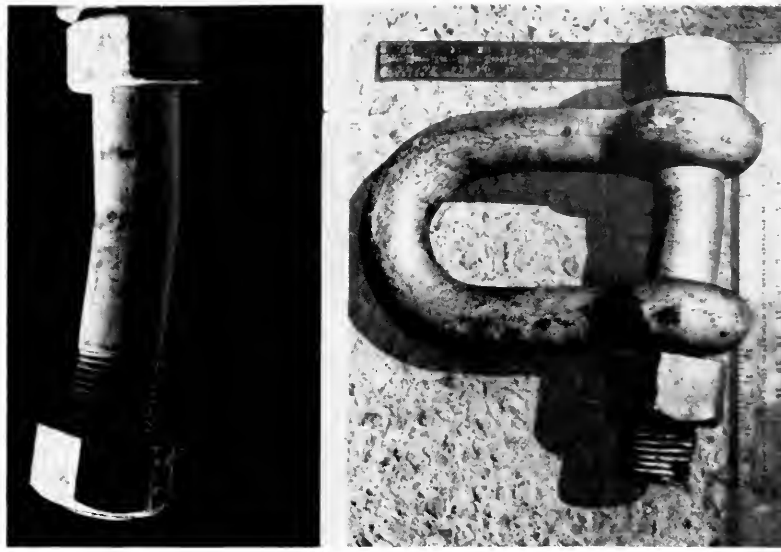
While the stresses corresponding to the given strain can be calculated in a simple bar, in this case the link was calibrated under a full range of loads in the 3,000,000-pound testing machine at the University of California Materials Testing Laboratory. The University states that an accuracy within two per cent can be expected in measurements made on this test link.

Both of the anchors were tested using 580 feet of 1⅝-inch-diameter plow steel wire cable, of which approximately 130 feet extended from the towing bitts over the stern to water level, giving an effective submerged length of 450 feet.

The 6000-lb. Navy stockless was lowered in 55 feet of water. The scope was 8.2 to 1. The holding power varied from 10,000 to 15,000 lbs., with an average value of 12,500 lbs.

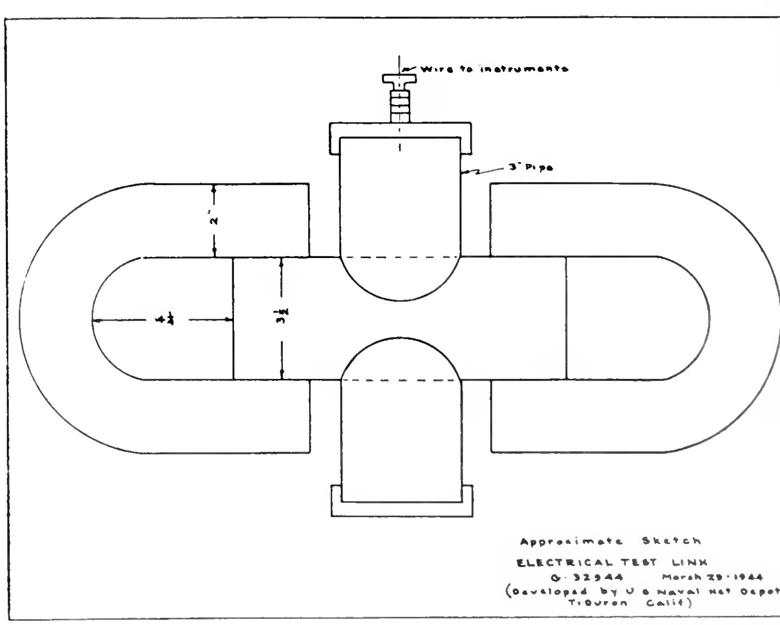
The 3000-lb. Danforth (actual weight 2930 lbs.), equipped with the modified shank adopted as standard for the large size Danforths in June, 1943, was lowered with a scope of 7.25 to 1 in the same holding ground.

During the test a pull of 75,000 lbs. was maintained steadily for ten to fifteen minutes without drag. This was the maximum steady pull possible due to recent overhauling of the Point Cabrillo engines. On the next test a surge pull of 175,000 lbs. was recorded. The peak of this pull was estimated at over 200,000 lbs. The strain was so great that some strands in the 1⅝-inch steel cable were broken and the pins in a standard 2½-inch shackle were bent as shown by the accompanying illustration.



2½-inch shackle and 2¾ pin as damaged in tests with 3000-lb. Danforth anchor. A 175,000-lb. surge pull caused damage illustrated. Anchor did not drag.

The high holding values of the Danforth are due to large fluke areas and the ability of the anchor to penetrate to firm ground. The small crown section and the long tapering flukes placed close to the shank minimize resistance to burial. The position of the flukes reduces rotational torque. The position of the stock provides stability and assures initial engagement. The pull on the cable digs the Danforth deep into firm holding ground.



Pacific WORLD TRADE

By T. Douglas MacMullen

World Trade and Post-war Unemployment

The No. 1 post-war problem in this as in most countries will be unemployment. What part our Government will have in solving it is not known, but in England the Minister for Reconstruction, Lord Woolton, has issued a plan for Britain. It is in the form of an official White Paper, and contains four requirements for the permanent stabilization of employment. "Time" magazine says it may well turn out to be a historic document, not only for the English but for Americans too.

It is not our purpose here to discuss the more or less socialistic program outlined in the paper (although budget balancing is a basic tenet), but rather to enlarge on the first of the four requirements—requirements which Britain, after two years of study, announces as indispensable. The first requirement is "Greater exports than ever before—even if it is necessary to restrict home consumption" (the "Nautical Gazette" estimates a 50 per cent increase to be necessary).

To be sure, Britain is not America, and foreign trade is more vital to her than it is to us. But stabilized employment is not more vital to her than to us, and foreign trade can vastly increase employment in this country, particularly on the Pacific Coast. As brought out in "Port Business Created by Shipping," in our June issue, foreign trade reaches back into every activity in the cities, and to only a somewhat lesser degree in the back-country. It is no longer a question of whether you are in world trade, but rather where you fit into, or **could** fit into, world trade. There are post-war millions who can and will fit into world trade, especially in the cities.

If you are an industrialist who has in the past thought only casually of exporting or importing, the time for thinking seriously about it is **now.** That day is not far away when we shall be faced with this proposition: "The war ended yesterday. The boys will be home tomorrow. Where do we go from here?" Too many of us will be caught napping. If you have never thought of your products as exportable, ask for assistance in making a study of export possibilities. If changes are necessary in your line, or if new products in your plant are possible, **make them.** Set a minimum quota in exports for your sales department, and see that it is trained for the task. If plant alterations or a new plant seem necessary, you can get help. A separate story in this World Trade section deals with some possibilities.

Export and Import Aid from R.F.C.'s Small Loans Agency

The question of what is a "small" industry is debatable, as the capital investment, number of employees, and volume of sales are factors. But "small industries" seems to be the designation for everyone likely to seek a loan.

When the Reconstruction Finance Corporation's loans to industry are mentioned, "small" industries are usually thought of, principally because large industries have means for financing without recourse to Government agencies; but, as will appear here, many of the larger ones also take advantage of R. F. C. help too. Sometimes it is because of the interest rates, sometimes because of a longer term for repayment, and sometimes because the loan is one that a bank cannot handle and the firm may not wish to resort to security issues.

The post-war period will see many firms seeking help for converting or reconverting to peacetime production, or expansion to care for new post-war trade and many other purposes. Returning soldiers and others who sacrificed their businesses because of war conditions, and who will wish to re-establish themselves, or who will wish to engage in new ventures, will be eligible for R. F. C. help, providing they can furnish some equity capital.

John S. McCullough, Jr., manager of the R. F. C. loan agency for Northern California and parts of Nevada and Oregon, states that the mere size of a loan is not determinative of the Agency's willingness to participate, and quotes figures on R. F. C. loans made up to May 15 of this year as follows:

Number	Amount	% of Total Number
6,700	under $5,000	32
3,300	5 to 10 thousand	15
4,369	10 to 25 thousand	20.7
2,226	25 to 50 thousand	12.4
1,196	50 to 100 thousand	9.5
964	100 to 200 thousand	4.6
645	200 to 500 thousand	3.1
192	500 to 1,000,000	.9
234	over one million	1.1

Thus in an aggregate of 21,115 loans totaling over $2,591,000,000 nearly 1/3 were under $5,000 and more than 90 per cent were under $100,000.

For "equity" capital in the immediate post-war period there will be a tremendous accumulation of private money, and the banks will be well supplied. The R. F. C. procedure is to let a bank receive the application and handle the mechanics of the loan, and then participate to an extent beyond the bank's willingness to go, and on terms and for periods beyond those usually available at the bank.

Import and Export

To the direct question of whether a firm's planning to expand its business by engaging in importing or exporting or for converting or enlarging its plant for the production of new or altered products for foreign trade would be considered for a loan, Mr. McCullough stated that such applications will be welcomed, providing questions as to experience and responsibility are satisfactorily answered. The loans go far beyond what the banks could consider, and at an interest rate that is usually 4 per cent for the R. F. C. proportion.

It is a common misconception that the R. F. C. participates in or influ-

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Pacific WORLD TRADE

Traffic on Foreign Flag Ships

Far from being isolationist is the shipping business. By the very nature of its dealings the industry is continuously involved with foreign peoples, and must at least understand their ways. In the past we have permitted foreign competition to get away with a very large part of American traffic, and it is not too soon for American interests so to plan their future that American ships will get the one-half or more of the volume to which they feel entitled.

There was some startled comment when Admiral Land said recently that in the post-war period at least 50 per cent of American freight should move in American ships. With nearly all freight moving in American ships now, the idea of 50 per cent seemed a decided drop, but a glance at some pre-war figures will show that 50 per cent would be quite an improvement. This is true in passenger traffic as well as freight.

Freight

Export dry freight handled over the piers in San Francisco during a recent year totaled 3,834.990 tons. This was distributed by flag as follows:

American	British	Other Foreign
541,553 tons	1,050,664 tons	2,242,773 tons

U. S. ships carried 14 per cent.

Import freight for the same year totaled 2,229,979 tons, distributed as follows:

American	British	Other Foreign
435,992 tons	803,901 tons	990,086 tons

U. S. ships carried 19 per cent.

Export tanker cargo from Pacific Coast ports for the same year totaled 7,911,538 tons, distributed as follows:

American	British	Other Foreign
1,439,732 tons	1,392,425 tons	5,079,381 tons

U. S. ships carried 18 per cent.

(In the case of imports, there is some softening of these figures to be found in the fact that in certain proprietary operations, and in certain other cargoes, such as sugar and lumber, where the freight does not pass over the piers, the ships are nearly always American owned or operated.)

Passengers

In 1938 there were 32,767 passenger arrivals at San Francisco (this was ⅝ of the Pacific Coast total). They were distributed by flag and accommodations as follows:

	Total	1st Cl.	Cabin	2nd Cl.	Tourist	3rd Cl.
American	10,583	4,788	1,301	19	1,403	3,072
British	10,920	10,406	411	18	....	85
Other Foreign	11,264	2,485	2,988	851	817	4,123
	32,767	17,679	4,710	888	2,220	7,280

Two things are noted in the above tabulation. One is the percentage of top classifications for the three groups. In American ships 57 per cent of the passengers are first-class and cabin-class. In the "other foreign" group 48 per cent are first-class and cabin-class. In British ships more than 99 per cent are first-class and cabin-class.

The other item of note is that only 32 per cent of arrivals traveled on American ships.

In the same year there were 36.979 passenger departures. A tabulation of these figures along the same line as for arrivals shows the following:

	Total	1st Cl.	Cabin	2nd Cl.	Tourist	3rd Cl.
American	10,804	6,173	1,454	21	1,262	1,894
British	14,206	13,615	490	16	....	85
Other Foreign	11,966	2,516	3,086	773	811	4,780
	36,979	22,304	5,033	810	2,073	6,759

Here again we note the percentage of top-flight service. On American ships 70 per cent of the departing passengers were first-class or cabin-class, more than 99 per cent on the British ships and 46 per cent on other foreign.

But only 30 per cent of all departures traveled on American ships.

Insurance

Even in marine insurance the percentage in premiums paid to foreign companies is large. Marine insurance premiums paid in California during the last pre-war year amounted to $12,584,843. Of this total $4,304.-473 went to foreign companies, either directly, through their agents here, or by reinsurance. This is roughly one-

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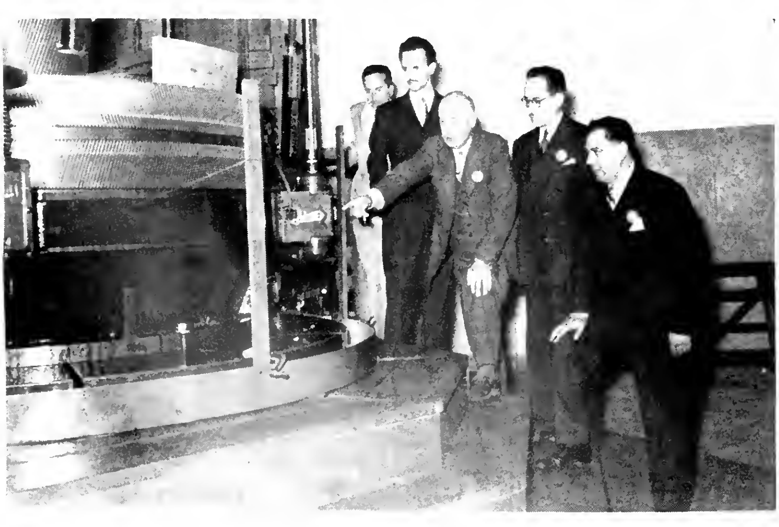

Pacific World Trade

Joshua Hendy Planning Post-war Exports

The pass-key to sustained success in the export market rests on the quality that the manufacturer builds into his product, is the belief of Felix Kahn, vice president of the Joshua Hendy Iron Works. He believes that the further the customer is from the manufacturing source, the more the customer depends on quality to assure him the least annoyance through requirements for reservice or replacement parts.

Joshua Hendy is counting on just such thinking to earn its way into a permanent export market, and the company points to the wartime record set for its turbines and gears and other power units to back up this contention. Hendy is also counting on the reputation set by its mining machinery equipment, which had extensive Latin American and Far Eastern distribution in the period that pre-dates the war.

Currently, the company is setting a pace that might well be followed by others looking for newer or broader export fields. Realizing that along with many other Western firms Hendy has so greatly expanded during the war that its facilities need to be re-introduced to men who will be responsible, in great part, for passing along information to their various Government officials or industrial interests in their own countries, this Sunnyvale organization is encouraging plant visits by foreign representatives.

Sparking a good portion of this activity for Hendy is E. A. Arnold of the Hendy Export Planning

Top: Felix Kahn and Juan Jose Martinez-Lacayo, consul-general of Nicaragua, inspect a marine turbine.

Center: A luncheon at Joshua Hendy plant for foreign consuls. Left to right, standing: Juan Jose Martinez-Lacayo, consul-general of Nicaragua and dean of the Consular corps; seated: Charles E. Moore, Hendy; Annibal Saboia-Lima, consul-general of Brazil; Felix Kahn, Hendy; C. T. Feng, consul-general of China; Dr. Roberto Quesada, conosul-general of Costa Rica.

Bottom: Left to right: Frederico Ostria Reyes, consul-general of Bolivia; Guillmero Benedetti, chancellor, Consulate of Panama; E. A. Arnold, Export Planning Group, Hendy; Hector Jara, chancellor, Mexican Consulate; Alex Borrios, Consulate of Guatemala. They are shown inspecting one of Joshua Hendy's big gear hobbers.

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Group. He makes his headquarters at Sunnyvale, but following through on many of his contacts requires constant trips between Sunnyvale and Washington, D. C. Mr. Arnold combines direct selling contacts with his broad overall program of export public relations for the company.

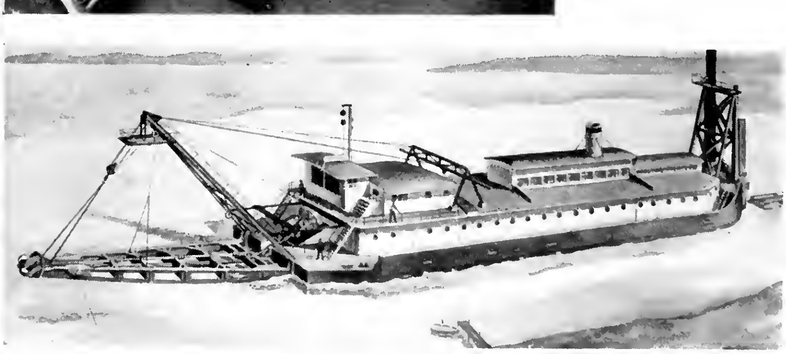
That plant visits by consular and other influential groups are productive of substantial interest is indicated by a report from one consular representative to the effect that he had written a 25-page outline of the facilities and products of the Hendy company to his Government, and he understood that most of the others present had done similarly. He stated that his office was constantly being urged by both Government and industry in his homeland to report on American firms and that the consuls would welcome opportunities to become familiar with the industrial situation here.

In this connection it is important to bring out a vital difference between the foreign importer and far too many American exporters. Many exporters develop the philosophy that anything we don't want can be exported. This philosophy has helped in turn to develop the attitude on the part of the public that we regard our foreign trade as what Admiral Land called the pre-war merchant marine, a "cross-eyed stepchild." Permanently successful foreign trade is based on the manufacture of things that will sell—things for which there is a need. Our foreign trade should be **engineered.**

On the recent return of the Liberty ship SS Joshua Hendy, the skipper, Captain William Barry, brought home an interesting side light in that at several ports in the Far East where the ship docked for cargo disbursements he was asked if that was the "Joshua Hendy of the big California mining machinery company." The captain said he was surprised to find this greeting, and repeated the story to plant officials here with the further comment that the reputation for such quality products had certainly been long-lived in that section of the globe which Hendy had served before the war.

Left to right: Charles E. Moore, president of Joshua Hendy; S. Makartumov, Russian Purchasing Commission, Washington, D. C.; Wallace Johnson, Hendy general sales manager. They are examining speed reduction gears for marine turbines.

Below: A Joshua Hendy design for suction dredge.



Lumber for China

There will be a lot of lumber going out on westbound ships as soon as the Pacific war ends. Some of the figures gathered by the China-America Council for Trade and Industry are large enough to stir the ambitions of everyone concerned with lumber production. It is estimated that in the 15 war-torn provinces of China some 84,000,000 people have been displaced from their homes and are war refugees, and that about 12,000,000 new homes will be necessary to shelter them, regardless of where they may settle.

The Chinese Government estimates that most of the refugees will return to their former localities and will want to set up some sort of a shelter. As a very minimum, the simplest of shelters would be one of 13 x 16 x 12 ft. high of wooden framework, with walls and roof of Chinese materials. The lumber ratio is figured at 2000 ft. to the dwelling unit, or 24,000,000,000 ft. of framing lumber.

Before the war, China imported considerable lumber from North America, and while every effort will be made to make use of domestic materials, the lumber requirements will have to be met very largely from this continent in the future, Washington, Oregon and British Columbia supplying most of it. In the past, the lumber production in China never went much higher than 3,000,000,000 ft. per year.

Hardware and Tools

Many people think of Chinese carpentry as involving only the use of wooden pegs and glue. The Government, however, figures that in the minimum home-building program mentioned above there will be a lot of nails used—35,000 tons of them. We do not ordinarily think of tools in terms of weight, but the Chinese have figured out another 100,000 tons of carpenters' hand tools, 35,000 tons of miscellaneous hardware such as window-fasteners, locks and hinges.

Pacific World Trade

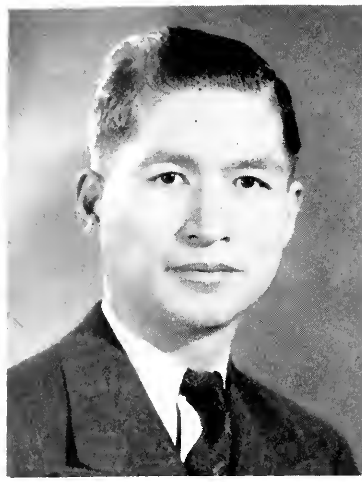
The Promise of the China Market

During the fourteenth and fifteenth centuries, the West thought of China as a land of fabulous wealth and picturesque customs. The imagination of Europe turned to Greece, Arabia, Persia, India and on to Cathay. When Columbus sailed across the Atlantic it was not to discover America; his destination was intended to be Cathay.

Since the eighteenth century the fairy tale has waned and the rational West has though of China in connection with its great potential market, but that market was just beginning to materialize when the war broke.

The Chinese nation is today committed to the policies and programs of Sun Yat Sen. Regardless of the political future of China, it seems probable that the Sun Yat Sen program will continue to be the policy of the country, for most active political groups are committed to it in one form or another. The program has been worked out in very careful detail, and there are elaborate analyses of China's mineral, agricultural and human resources, together with programs for post-war development in agriculture, mining, transportation and all-round industrialization. The program of financing is just as carefully prepared.

There seems to be every inclination to do as much business as possible with the United States, and to substitute United States goods for imports formerly coming from other countries. It is true, of course, that as far as privately used commodities are concerned various factors enter into the purchase. The United States has been maintaining its historic friendliness for China, and China is reciprocating. It is also true that certain of China's previous sources of supply will be curtailed. But regardless of the reason, the United States is going to get tremendously greater volume of business from China, even if the normal pre-war conditions in China were to continue.



Hon. C. T. Feng, consul-general at San Francisco for China.

An authority on Far Eastern commerce, M. J. Buckley, vice president, American President Lines, says, "Of course, we look for great expansion in China. Modernization, on a substantial basis, should commence immediately. Our association with that great country in the common war effort, following the unbroken friendship and trade relations of the past, should bring an aftermath of mutually beneficial intercourse and sensibly increase our interchange of commerce."

When we say that some of the previous sources for materials will be restricted, we refer to Germany, Japan and Britain; the last-named, of course, will be busy with its own reconstruction and with nearer markets. In 1936, which was China's last normal year, imports of metals and ores from Germany were $23,000,000, from Japan $21,500,000, from Britain $19,700,000, and from the U. S. $16,700,000. Thus if China imports from the U. S. only the added total that the other three countries shipped, our $16,000,000 would be increased to over $80,000,000.

China imported machinery and tools from Germany $13,700,000, from Japan $16,700,000, from Britain $11,400,000, and from the U. S. $7,000,000. Here again our total would rise from $7,000,000 to nearly $49,000,000.

China imported vehicles and vessels from Germany $7,300,000, from Japan $7,200,000, from Britain $11,700,000, and from U. S. $13,200,000. Here our total would rise from $13,000,000 to $39,000,000. And similarly with many other items, principally chemicals, drugs, dyes, pigments, oils and waxes.

It is said, even by the Chinese themselves, that the problem of the unfavorable balance of trade created in China by greatly increased imports will be a very serious one, because China's dollar income was made up, to a very large degree, by remittances from "over-seas" Chinese, most of whom were and are in the South Sea area and who have during the war become impoverished. Such remittances reached a high point of $320,000,000 in 1936—more than half the value of China's principal imports.

There are several factors, however, which are often overlooked. One is that certain of China's important exports will be in greater demand in a prosperous United States than they were before the war. In the order of their value, such exports were oils, animal products, textiles and fibers, seeds, metals and ores, and tea. Inquiry here indicates that there will be a substantial revival in Chinese silk, especially as China is planning a "grading" system to assure uniform quality. It is probable that the item of wood oils and also the items tea, metals, and ores, as well as hardwoods, will be in very much greater demand here.

Another vitally important addition to China's export trade with the U. S. will come from the practical elimination of Japan as an exporting nation for a long time. Many of the kinds of goods which the U. S. formerly imported from Japan, and which Japan had obtained in China, will

The bamboo symbolizes for China strength, humility, flexibility, grace and beauty.

Pacific WORLD TRADE

now come directly from China, setting up dollar exchange instead of yen.

Another development that China can contemplate is the export of Chinese products to all of the South Seas area, including Australia and India. It is assumed that China will be manufacturing many lines of goods which Japan formerly controlled.

Still another development in China will be, with substantial industrialization, a tremendously increased total of foreign capital investments. Such self-liquidating projects as power plants, mines, ships and factories will bring very large dollar exchange to China, money which will not, like loans, be a continuing burden.

Pre-war China

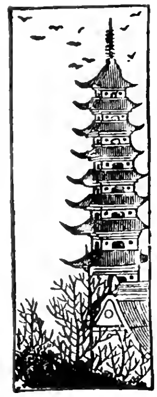
From Mr. Shen and Mr. Nipp of the Chinese News Service, as well as from Consul General Feng at San Francisco, we have figures on certain phases of industry in China before the war, and also on the program for the future.

China's steel industry produced about 50,000 tons per year. There were 4,500,000 cotton spindles in operation (of which about half were Jap-owned). There were about 60,000 miles of highways and about 12,000 miles of railroad, including the lines in Manchuria.

Post-war China

Under Chiang Kai-Shek's ten-year program there will be 100,000 miles of railroad and 1,000,000 miles of highways. The railroads will need 25,000 locomotives, 30,000 passenger cars and 300,000 freight cars, as well as 20,000,000 tons of steel.

The power plant program calls for production of 20,000,000 kilowatts, and any such production will require stupendous figures in the way of wire and cable, motors and machines, appliances and lamps. They figure on 1,000,000 new homes (completely equipped) each year, and millions of telephones. Hundreds of thousands of looms for cotton, wool and silk will be an immediate need.



The ten-year plan calls for men, and needless to say they have to be good and have to come before anything else. For instance, there is the little item of doctors, 230,000; then follow civil engineers, 110,000; mechanical engineers, 41,900; architects, 25,000; electrical engineers, 12,000. It would seem that the engineering colleges will have plenty to do if they just supply China alone, and that the steamship companies have a lot of passengers pretty well scheduled.

Next: BRAZIL.

TRAFFIC ON FOREIGN FLAG SHIPS

(Continued from page 87)

third. In aviation insurance the foreign proportion is much greater: $396,400 out of a total of $743,964.

Not to be overlooked is the other side of the picture. Money payments of any kind to foreign nationals set up a balance of dollars with which American goods can be bought. Dollars paid for freight charges are no different from dollars paid for imports, and the American exporter is no more important in world trade than the foreign importer, nor is the American importer more important than the foreign exporter. With the United States a predominant shipper, the dollars will come back, and soon. Forward-looking business leaders believe, however, that a strong and well-supported American merchant marine should be assured before any percentage even approaching fifty should be permitted to fall to foreign flag ships. Traffic and export managers need to have this brought home to them, and if there is room for improvement, the time to think about it seriously is now.

Air-Steamer Competition

The development of air service by steamship companies is being considered from two points of view, points of view which have little in common. One of these is simply the ambition to get into what seems to be a profitable transportation service to bolster lagging income and perhaps add feeder and passenger facilities to a service that would otherwise be limited to freight. The other point of view is that of the company whose present or past passenger business as well as freight may be adversely affected by a glamorous and speedier competitor.

Under the stated policy of the Civil Aeronautics Board, both of the above groups might be prevented from engaging in air operations if they are competitive with their surface lines. There is no restriction, as we see it, on mere feeder lines.

First of all, the Government seems unduly discriminatory. No such effort has been made to restrict other lines of business in their progressive ambitions. For instance, gas light companies have gone into electricity, directly competitive. Oil companies have advanced from kerosene to gasoline and on to fuel oil, and they are praised for their progressiveness. Insurance companies take on new lines, automobile dealers add radios and refrigerators, stage theaters add movies, railroads add express and highway service, the miners' trade union goes out after farmer members, and drug stores add everything. Even the shipping lines have advanced from sail to steam, horse-car lines have gone first to cable, then to electric and then to bus, drayage companies from horse-drawn to motor truck, and even the Navy has added an air arm.

But it is not the legal or social aspect that we propose to discuss, but rather the commercial one of comparative freight rates.

There should be no prohibition on steamship companies' operating air lines over approximately their present routes—although the shortest air route would not necessarily be the steamer route; in fact it would seldom be the same. It occurs to us, however, that not all of the steamship companies who talk about air lines will really want to operate them. The passenger services may, but not most of the strictly cargo lines.

The cargo rates by air are high. Very high. For instance, from

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Commodities are listed in the order of volume of shipments handled in normal pre-war days.

Brownsville, Texas, to Rio is $198 per hundred pounds, or $3960 per ton. From Seattle to Fairbanks, $90 per hundred, or $1800 per ton; from San Francisco to Honolulu (prewar), $93 per hundred or $1860 per ton; to Guam, $161 per hundred or $3220 per ton; to Manila, $200 per hundred or $4000 per ton; to Hongkong, $219 per hundred or $4380 per ton (Pan American tariff). It is idle to compare such figures with such surface rates as San Francisco to Honolulu, $17.50 to $25 per 2000-pound ton, or to Guam, Manila, China and Japan, $56 per 2000-pound ton. These are the all-commodity rates, and are generally much higher than any special commodity rate. Even the minimum charge by steamer to Honolulu, which is $1.50, takes care of a considerable item in an airplane load. The $1.50 will take 350 pounds, or seven cubic feet of cargo. There are odds and ends of charges at either terminal by either method, and they probably total about the same, considering that airports are not usually located as near to the city as the steamer pier is.

In domestic service the airlines compete for certain commodities that are light in weight and that move at premium rates. Some of these items do not move at all in foreign traffic and the variance in steamer rates is scarcely worth considering. It is pretty generally agreed that very little steam tonnage will be diverted to air, but on the contrary the air services will by pioneering and by feeder lines greatly increase the steamer volume.

The reason for such high air rates is not hard to find. Apart from the investment, depreciation, and the cost of executive and sales management, the cost of operating an airplane is much greater than is generally supposed. A plane with a crew of 11 would have a crew pay roll of upwards of $4300 per month, with salaries ranging from that of the plane commander at $800 down to that of the stewards at around $150. It is estimated that an aircraft in cargo operation can be maintained by about 2½ man-hours per flying hour for each ton of weight empty, and that the average man-hour cost is $2.75, made up of material, 25c; labor, $1.25; overhead, $1.25. Thus if a plane with a gross weight empty of 80 tons is in the air 200 hours per month, the ground cost of maintaining it is $48,000 per month.

No such costs apply to small feeder-line planes, hence the rates can be such as to permit their use to off-line points which may be entirely out of reach of the cargo steamers. As far as we know, there are no feeder services contemplated by the major operators in the Pacific, either air or steamer, but it is a foregone conclusion that there will be such in the future.

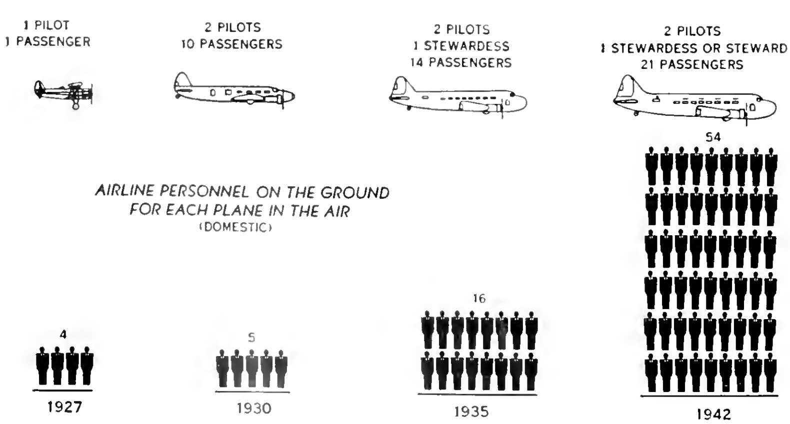
As far as freight is concerned, the steamer lines have little to worry about from the air lines, and may, on the contrary, expect many benefits.

The passenger situation is another story, and will be dealt with in another issue. It is of no interest at all to many of the steamship lines, or at least not from any competitive interest.

Next: The Steamship Companies' Program

Many people—businessmen especially—think of the future, when they dare to think of it at all, as a pleasant continuation of the present. But the future, for good or evil, is not like the present. For practical ideas about the future, Tennyson had something in his "Locksley Hall":

For I dipped into the future, far as human eye could see,
Saw the vision of the world, and all the wonders that would be;
Saw the heavens fill with commerce, argosies of magic sails;
Pilots of the purple twilight dropping down with costly bales;
Heard the heavens fill with shouting, and there rained a ghastly dew
From the nation's airy navies grappling in the central blue,
Till the war-drums throbbed no longer and the battle flags were furled,
In the Parliament of man, the Federation of the world.



AIRLINE PERSONNEL ON THE GROUND FOR EACH PLANE IN THE AIR (DOMESTIC)

Pacific WORLD TRADE

International Monetary Plan

Representatives of 34 Allied and other countries took an active part in the preliminary discussions leading to the issuance of the draft of a plan for an International Monetary Fund at their meeting in April of this year. According to many authorities, the plan, which was announced by Secretary of the Treasury Morgenthau, paves the way for the eventual solution of one of the important problems involved in the establishment of a solid foundation for world trade relations after the war—the question of currency stabilization. The preliminary plan will be the basis of formal negotiations to be conducted by the various countries and of discussions to be carried on at the forthcoming International Currency Conference.

The subscriptions of member countries to the proposed $8,000,000,000 fund is to be determined by an agreed formula taking account, it is understood, of the proportion of each country's trade to world trade, its gold holdings and gold production. On this basis the United States would contribute between 2½ and 2¾ billion dollars, Great Britain about 1¼ billion, Russia about 1 billion, China about 600 million and Canada about 300 million.

Currency Solution Imperative

By Lloyd Mazzera

Vice President, International Banking Department, Bank of America

The matter of post-war currency arrangements, and organization of foreign exchange market, is one of great and absorbing interest; it is also highly controversial. I believe it is a healthy sign that in the active discussion of post-war currency plans many differences of opinion should have emerged. Four plans have been proposed for the creation of an international monetary standard. All plans call for international measures which embody the most important features of the international gold standard. These are free multilateral clearing, stability of exchange rates and conformity of national economic policies, with the necessity of balancing international payments and, by so doing, minimizing the strain on the exchange rate.

Lloyd Mazzera, Vice President, International Banking Dept., Bank of America.

It is most likely that for months, or even years, following the close of the war, countries will be impoverished and under great strain. There will be much need of help, and the best means of extending that assistance is through the creation of a new international institution. Call it what you may—a stabilization fund, clearing union or bank. This institution would naturally create a new money, to be supported by gold, national securities and national currency. It should be able within certain well defined limits, and under good management, to finance impoverished and war-torn countries which have no immediate means of payment over the temporary strain of their balances of payments caused by the restoration of international trade.

I feel that for some time to come, most of the world will be short of dollars and other forms of payment needed to purchase supplies. For reconstruction and development, long-term loans will be requested, for which special arrangements could be made. I do not believe, however, that it should be the function of this institution to provide the funds. Its primary purpose should be that of financing only short-term, self-liquidating commercial banking transactions, and the making of advances to place national central banks in possession again of liquid assets.

After the first year of operation there is no question but that its balance sheet will be very much out of line. It will probably lose its gold, and build up its holdings of national currency and securities of the participating and impoverished countries. This bank is really created for that reason; to tide over a period of trying times and undue hardships and prevent either loose and wild lending or wholesale exchange depreciation. If the exchange parities are properly adjusted in due time, this unbalanced condition will be righted and the international institution will again have a reasonably proportioned distribution of resources.

Westinghouse Now in Import Field

The Westinghouse Electric International Company, which for more than 25 years has operated in the international field as an exporter, has now entered the import field, John W. White, president, has announced.

"We propose to use our worldwide organization as the basis for conducting a general import business," Mr. White said. "The company is well fitted to carry on this type of trade because of its long international experience.

"By this move, Westinghouse will do its part in furthering reciprocal trade among nations. Instead of the old 'one-way street,' we propose to open a wide two-way highway for future foreign trade."

Export and Import Aid

(Continued from page 86)

ences the management of borrowing firms. Such is not the case. Only in the event that the loan is not properly serviced does the Government have any concern with management, and then only to protect its investment.

Many a firm, seriously worried over post-war reconversion, or retooling, or reselling its markets both domestic and foreign, or with reemploying its warrior staff, would do well to look into the R. F. C. program. The R. F. C. is an agency with neither a war nor a New Deal origin. It may provide an answer to a part of the post-war problem.

The Electric Strain Gage In the Service of Shipbuilding

By M. M. Grane

THE ELECTRIC Strain gage is a device used for measuring linear dimensions or displacements, which are transformed into readings on an electrical instrument. Since stress, torque, force and acceleration produce different types of displacement, the strain gage is being used for such measurements.

The stresses considered in ship computations are of different natures. The weight of the ship and of its machinery creates in the first place longitudinal stresses. The transverse normal stresses are of less importance. The stresses that result from longitudinal bending moments are of major importance and are usually determined graphically by a method similar to that used for any beam. The ship's buoyancy, or the ship's weight and support, are plotted, and from these integrations the ship's load-curves, shear and bending-moment curves are obtained. Only these major stresses are subject to computations.

Stresses which may result as a combination of the major stresses cannot readily be interpreted on a quantitative basis, and the designer is guided by experience in his considerations for strength and stiffness of the ship. In ship calculations the assumption is made that the material is isotropic, homogeneous, and obeys Hooke's Law, that stresses are within the elastic limit, that the tensile and compressive moduli of elasticity are equal, that the cross section under conditions of shear remain a plane surface. These assumptions, however, cannot fully be applied to modern welded ships. The method and technique of welding are liable to change or influence the microstructure of the material and its chemical and physical properties.

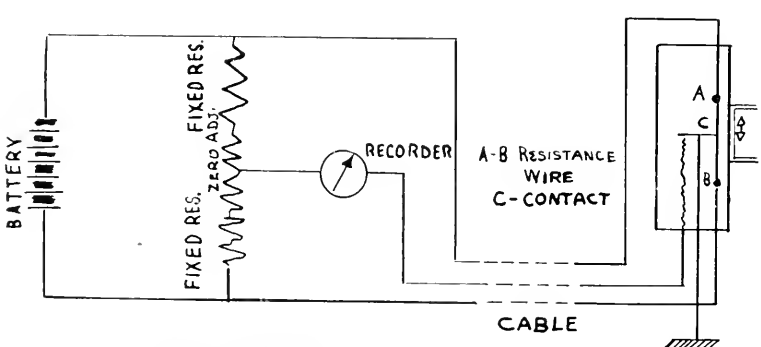


FIG. 1

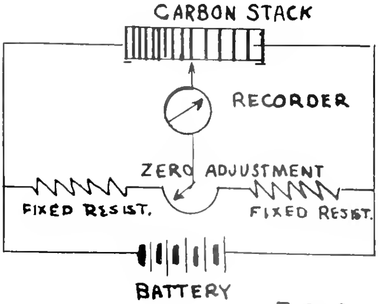


FIG. 2
CARBON TYPE ELECTRIC STRAIN GAGE

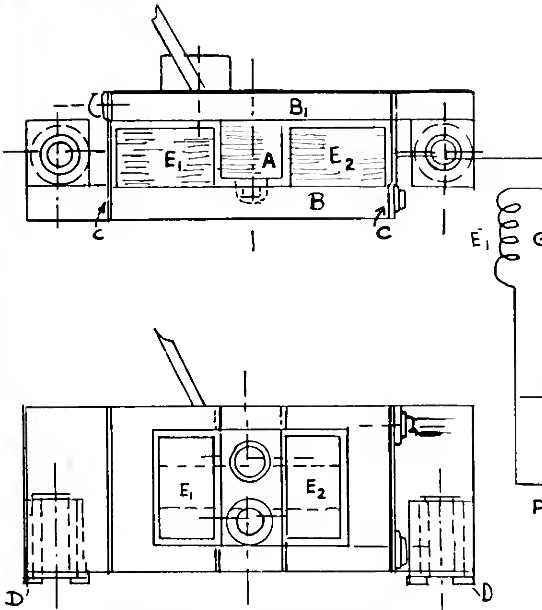
Chemical and Physical Properties

It should be kept in mind that the temperature and oxygen of the air have a great effect on the composition of steel and iron in a molten condition during formation of the weld. At relatively low temperatures oxygen combines with Si, Mn, P. in preference to carbon. As the temperature rises, the affinity of oxygen to carbon increases until it exceeds that of the other elements. At high temperature carbon can reduce the oxides of all nearby elements in presence of iron which dissolves the reduced elements. Steel is regarded as a solid solution of iron carbide or cementite in iron with a carbon content below 2 per cent. The cooling time of molten iron in steel production as in the process of welding has a great effect on the solubility of carbon and the properties of the steel. If the cooling is very rapid, a supersaturated solid solution of carbon results, and the steel thus obtained is hard and brittle.

From this short review of the properties of iron, it can be understood why an improper welding technique, improper electrodes and rapid cooling-off lead to changes in the properties of the material and to stress concentrations.

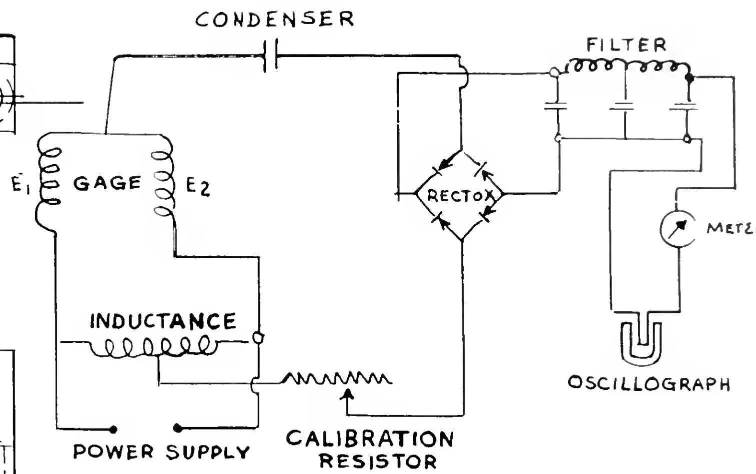
Magnetic and Electrical Properties

The magnetic and electrical properties also change with the carbon content in steel or iron. The higher the carbon content, the higher is the conductivity of the iron. The mag-



MAGNETIC STRAIN GAGE

FIG. 3



MAGNETIC STRAIN GAGE
ELECTRICAL DIAGRAM

FIG. 4

netic capacity of steel and iron is directly proportional to the softness. With the increase of hardness, the electric conductivity of iron decreases. A number of instruments and methods have been devised for such tests on welded steel plates for prefabricated ships. The best methods and technique of welding are those which provide ductility in the weld, for even when the weld will not be subjected in service to any loading stresses, its ductility will permit internal adjustments of its minute particles, and will distribute the total tensile, or shear or torsion, stress more uniformly over the entire cross-section subject to the stress.

Static and Dynamic Stresses

Stresses set up in the material during fabrication or construction of the ship can partly be relieved by "peening," as, for example, with a pneumatic hammer. Other stresses to be also considered as static are the weight of structures, machinery, tanks and other dead loads, and also the stresses caused by slow-moving loads. The dynamic type of stresses which introduce the "time" factor are chiefly caused by rolling loads, such as the rotation of the propeller and rudder, or are the result of shock loads, such as in the connecting rods of reciprocating engines.

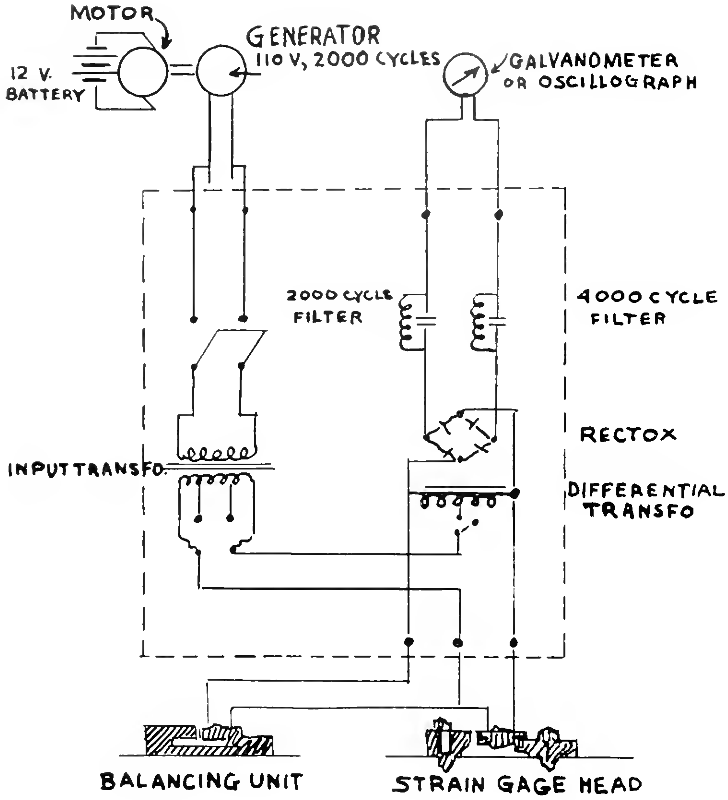
Because force of gravity is always present and produces static loads, it is wrong to apply either dynamic or static loads alone when trying to imitate natural field conditions. Only the right combination of both types of loadings will meet the actual requirements, because the effect of both types of loadings on a ship, as on a bridge or any other structure, is such that they can rarely be added directly. Fatigue, hysteresis, creep and aging should also be considered as a part of that combination. These combined forces do not lend themselves to simple analysis and calculations.

The algebraic sum of the static and dynamic stresses may lead to the phenomenon of resonance. The destructive effect on machinery by vibrations in resonance is well known. Resonance effects may also lead to destruction of ships at sea, effects which could not be foreseen by calculations alone, but could be prevented in many cases by the study of locked-in stresses and alterations in the design.

Stress Concentrations

In any structural part that has any sort of notch or groove, the maximum stress will occur immediately at the change of cross-section. One method of determining stress-concentration factors is by the use of photoelectricity, in which transparent models are examined under polarized light. When a body containing stress concentrations is loaded and the load reversed, frequently a crack may develop in the material with the tendency to propagate, and eventually the member may fail by "fatigue." These fatigue cracks originate at obvious surface notches, but they may also start at local weaknesses due to poor welds. By measuring the average stresses in one cross-section with numerous recording instruments, a more or less complete picture of stress distribution in a vibrating system will be determined. The change in distance between two gage points recorded by the instrument yields the stress. This recording method is being used for static tests.

As noted before, the data obtained from static tests alone should not be regarded as conclusive for the study of the stress-analysis of a ship. Only tests made on ships in motion at working conditions will lead to useful conclusions. The modern electric strain gage enables one to measure the combined static and dynamic stresses, which were too complex to permit ready calculations, and also to study resonance behavior of different ship members at different speeds. The



ELECTRIC STRAIN GAGE
SCHEMATIC DIAGRAM

FIG. 5

resonance effect in ships between decks and propeller rotation or hull and water waves may cause dangerous disturbances. The data thus obtained, compared with the theoretical calculations, give a better understanding of the working conditions and ability of a ship.

Strain Gage Principle

The electric strain gage is based on the principle that variations in linear dimensions can be transformed into variations of an electrical resistance, or capacitance, or inductance, or of a given wave form. These different electrical variations are measured by electrical current or voltage meters. The strain gage proper represents a development of the well-known extensiometer, in use for many years for measuring linear displacements. In service, the extensiometer is clamped or screwed to two points of the member to be tested and the relative motion of these two points is recorded or read on a micrometer as the load is increased or decreased. With some extensiometers elongations may be 0.001 of an inch.

Wire Resistance Gage: The electric strain gage went through different stages of development. Its oldest form, as shown in Fig. 1, is based on the change in the value of an electrical resistance of a wire formed by a sliding contact. The contact is rigidly connected to the point at which deflections have to be measured, and the two changing branches of the electrical measuring wire on both sides of the contact form the arms of a Wheatstone Bridge. The change in resistance is recorded as an electric current. This method is still in use for large deflections, such as bending tests on a ship.

Carbon Resistance Gage: Another type of electric strain gage is based on a change in electrical resistance due to compression of a stack of carbon disks on thin annular carbon rings. Two carbon piles of disks are built into each instrument and connected to two arms of a Wheatstone Bridge circuit. The middle movable point and any other end of the stack are clamped to the structure to be tested. Any displacement of the movable point between the two precompressed and balanced stacks changes their relative volumes and consequently the electrical contact resistance values. These changes are indicated by a recorder or oscillograph. The diagram is shown in Fig. 2.

Magnetic Gage: A third type of electric strain gage is based on the variation of reluctance (or magnetic resistance) due to displacement of an iron core in a magnetic field. This principle is utilized by several strain gage manufacturers, and is introduced as Moulin Stress Recorder, Westinghouse Magnetic Strain Gage and others.

The wire-resistance and carbon-resistance gaging system uses voltages of not over 24 volts direct current, which can be supplied from storage batteries, while other more modern electric gages, described below, require high voltages and some electric tubes. The changes in reluctance of the third method mentioned above are due to the changes in the air gap between two measuring points. The bridge principle is also used in this method and also two identical reactors, with air gaps. In one design method, Fig. 5, the air gap in one reactor is fixed, while that in the other is caused to change with the displacement of the structure being studied. In a second type the relative size of the 2 gaps is changing, Fig. 3. An alternating voltage of a known frequency is applied across the diagonal of the bridge circuit, and a sensitive instrument is connected across the other diagonal. When both air gaps are equal in the first type of strain gage, the bridge circuit is balanced and the instrument indicates zero. An increase or decrease in either air gap of Fig. 3 will unbalance the bridge circuit and induce a current in the recording instrument. Figure 4 shows a diagram for measurement of dynamic stresses. In this case an

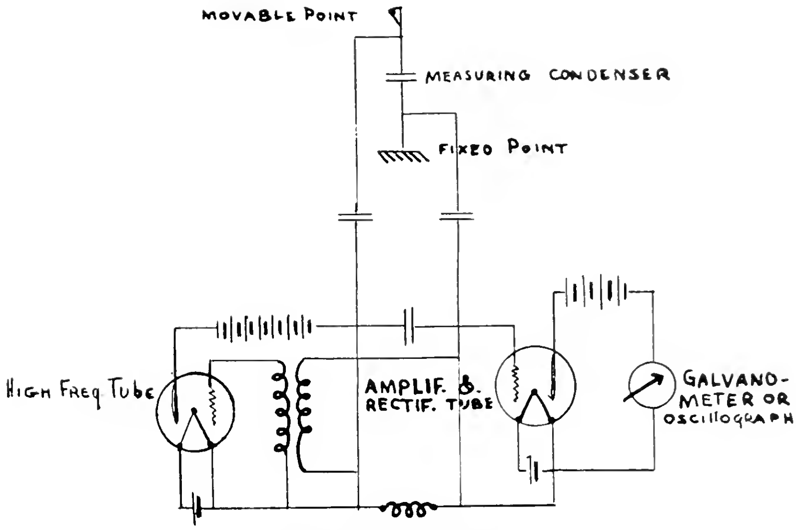
oscillograph with a permanent magnet field is used. For static or very low frequency deflections with periods of 2 seconds or longer, a graphic meter can be used and the filter can be eliminated.

Figure 3 shows the construction of the strain gage proper used with Fig. 4. E_1 and E_2 are laminated iron cores, which are rigidly attached to frame B. A is a laminated iron armature attached to frame B_1. Frames B and B_1 are connected together by four leaf springs C which allow relative motion between the frames in only one direction and act as frictionless guides. When such a motion occurs, the air gap between A and E_1 decreases and that between A and E_2 increases, or vice versa. The change in the reluctance of the magnetic paths changes the impedance of the two coils wound on them. The coils and the adjustable center-tapped inductance are connected in a bridge circuit energized by an alternating current. When the coils are thrown out of balance, current passes through the instrument on which readings are being taken. Up to 0.01 inches the instrument current is proportional to the motion and the calibration is linear.

The strain gage of Fig. 3 is 3 inches long and 1¼ inches wide.

Figure 5 shows diagrammatically a typical equipment required for measuring dynamic strains. A high frequency power supply of 2000 cycles is being used for the gage excitation. Instead of the high frequency motor-generator a vacuum-tube oscillator can be used. Usually the 2000-cycle power supply has sufficient capacity for operating several gage heads. Twelve channels can be operated simultaneously with this equipment, depending on the application, and one oscillograph provides for six channels and a timing band.

Capacity Type Strain Gage: The diagram of Fig. 6 shows a capacity type strain gage. The instrument is based on the change in the distance between two condenser plates forming a part of the electrical circuit. One of the plates is rigidly connected to the fixed point of strain gage, the other to the movable. Any change in the air gap between the two measuring plates causes a change in the frequency and grid currents of two amplifying tubes and is indicated accordingly on an oscillograph. This method can be used for measuring static stresses only by replacing the oscillograph with a meter or recorder.



CONDENSER METHOD
STRAIN GAGE

FIG. 6

Piezo-Electric Strain Gage: The diagrams of Fig. 7 and Fig. 8 are based on two recent developments, namely of piezo-electric effect and of radio tubes with high amplification factors.

The piezo-electric effect was discovered by the Curies in 1880. They measured the effect first for a quartz crystal by putting a weight on the surface and measuring the charge appearing on the surface, the magnitude

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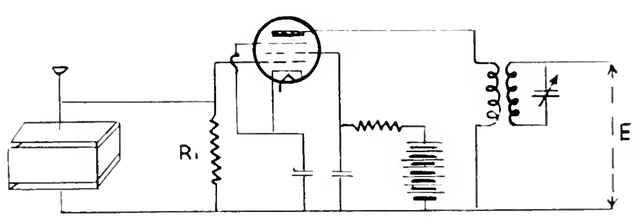
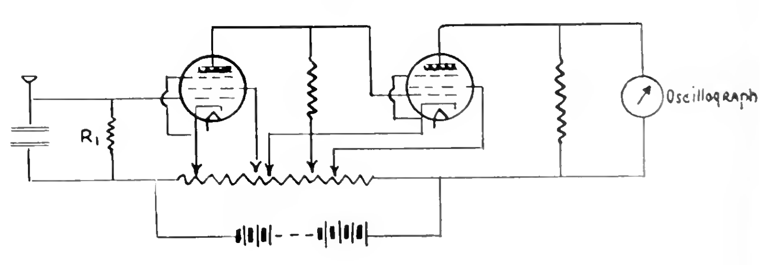


PIEZO-ELECTRIC
ELECTRONIC STRAIN GAGE FIG. 7



PIEZO-ELECTRIC
ELECTRONIC STRAIN GAGE FIG 8

Bearings and Lubrication

I—BEARINGS

*By S. Kyropoulos**

The vast majority of bearings are designed to operate under conditions of **full-fluid lubrication** (see later). Crossheads and thrust bearings (especially the Kingsbury, or Michell types) are not fundamentally different in that respect from the plain bearings we discuss. Usually, the bearing consists of a very rigid shell (bronze, steel, cast iron) and a lining of a softer alloy, such as white metal (a tin-antimony-copper alloy), cast into the shell. Casting is a convenience rather than a necessity, because the alloys happen to melt so low.

The lining has to be bonded to the shell as an integral unit for maximum transfer of the heat generated by the oil friction in the annular space between shaft and bearing. For reasons of strength and heat transfer the lining has to be as thin as operation conditions permit. The dimensions of the bearing are calculated to fit the load. The ratio of length to diameter is generally, nowadays, kept between 1 and 0.5 because with pressure lubrication and small bearing clearances it is easier to check excessive axial oil leak and thus to make use of the advantages of a short, less flexing shaft. An infinitely long and rigid shaft and bearing would not necessitate such considerations, but even short and heavy shafts flex more than one would guess. Flexion of the shaft results in areas of impaired fluid lubrication and higher friction. The best means of counteracting its effects is to provide self-aligning bearings where possible.

* California Institute of Technology, Pasadena; Consultant, American Metal Bearing Co., Los Angeles, California.

Clearance

Load capacity, oil viscosity and bearing clearance are connected by a definite relationship, in which the clearance is obviously a factor of design. The load capacity increases with decreasing clearance but the profitable decrease of the clearance is limited. Clearance is one of the most vital factors for bearing life and operation and a factor upon which the operator has some influence in case of replacement.

The most important point is this: a clearance between shaft and bearing is indispensable to fluid lubrication as will be explained in the section on lubrication. Hence, an old-fashioned fitted bearing defeats the purpose; the more thoroughly, the more carefully it is fitted. In this case there is practically no clearance left and such a bearing will have "mixed" friction and run hot. Whenever in rare special cases, for instance due to shaft conditions, fitting should be believed indispensable, provision should be made for some clearance by scraping out some more stock in the load carrying part of the bearing, especially at the side from which the shaft pumps the oil into the loaded area.

The natural limit of clearance is the degree of smoothness of the surfaces. Shaft diameter, speed and location of the bearing enter into consideration (location because heat exchange and expansion of shaft and bearing depend on it). These determine in turn the **actual operating clearance** which usually is smaller than the workshop clearance. Obviously the shaft is hotter than the bearing and free to expand toward the bearing which usually is more directly cooled and often more restricted in its outward expansion. Thus, the bearing may even expand toward the shaft. These individual conditions have to be taken into account and their proper consideration requires engineering training, foresight and experience. The true operating clearance is the one that determines load capacity and general bearing performance. This is the "true design clearance" and for the same size of this, there may (and generally should) be various workshop clearances specified on the drawings of various engine parts. This subject is one of the most intricate research problems. Nevertheless, some prac-

Fig. 1. Cracked bearing showing grooving and pattern of shaft vibration. Upper part unfit for fluid lubrication.

tical rules have been developed. As a result, depending on conditions, the diametral (shop) bearing clearance is usually made between one and two thousandths of an inch per inch of the shaft diameter. Broadly speaking, the writer favors clearances toward the larger figure.

Oil Temperatures

Overtemperatures in the oil film should never exceed 120° F. The oil flow through the bearing carries away a great part of the heat. A wider clearance permits a faster oil flow. Good cooling also checks undesirable changes in the lining alloy. Too small a clearance may cause shaft vibrations resulting in increased friction, pounding of the bearing and even damage to the whole engine.

Fig. 1 illustrates such a case as evidenced by the regular pounding pattern of glazed spots. Another interesting case is shown in Fig. 2. This bearing contains dovetails. We notice glazed, flattened zones at the dovetails, subdividing the bearing into a number of ring-shaped zones because the lining expanded at the thicker dovetails about twice as much toward the shaft as between the dovetails. This case illustrates the difference between workshop and operating clearance. Obviously such a bearing can work properly only at temperatures near the workshop temperature, where the differences in expansion at the various zones are negligible. The higher the temperature rises, the more there appears a succession of hills and valleys, "rings," perpendicular to the axis, a small scale model of a bearing with "ring" grooves.

Grooves and Fabrication

Provided, a bearing of the type of Fig. 3 is properly calculated, it is rather a "twin" bearing than a grooved one. That is to say: a properly designed and manufactured full bearing (a bush or one consisting of two halves), with or without shims at the separation, has to be machined as an integral unit and as a perfect cylinder with its proper calculated clearance with respect to the shaft. It may be useful to relieve the linings slightly at the separation. At the same place there should be chamfers or "oil pockets" (Figs. 1 and 3). Generally, grooves have no place in a good modern bearing; Fig. 1 is a characteristic bad case. Here the grooves do not improve but seriously impair fluid lubrication. There are two exceptions:

(1) Very long bearings may require one axial oil distributing groove, shorter than the bearing, in the unloaded part and differing from an oil pocket only by being the place where the oil enters.

(2) Bearings where full fluid lubrication cannot be obtained anyhow, such as bearings with very highly loaded, very slowly rotating shafts. Finally, simple thrust (horseshoe) bearings and bearings for oscillatory motion.

Conditions of very high load combined with very slow rotation, where fluid lubrication cannot be obtained,

Fig. 2. Effect of dovetails on bearing performance due to greater expansion at dovetails.

call for rolling contact ("anti-friction") bearings. The same is true of many cases of oscillatory motion.

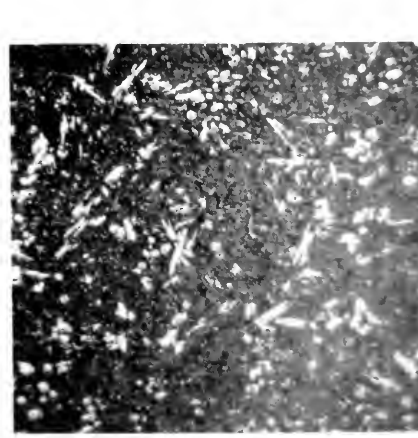
Returning to the bearing Fig. 3, we may say that its groove is a simple way of providing the next crankpin or piston pin bearing with oil and that there is no rule to forbid twinning of two bearings. The "twinning" of bearings and the circumferential groove can be turned to advantage because it permits a better cooling by a richer oil flow. Thus it may both prolong the life of the bearing and even raise its load capacity. This case however is involved and very rare. We shall refer to it again in the lubrication section. Whether we are faced with a true "twinning" or whether only the whole, ungrooved bearing could carry the load, can be decided from the service it gives or from its dimensions. The fracture, Fig. 3, is due to bending stress.

Partial Bearings

In application where the load is vertical partial bearings are fre-

Fig. 3, left: Bearing showing fatigue cracks and crystal structure due to intracrystalline precipitation and volume expansion. Diameter 8 inches.

Fig. 4, right: Photomicrograph of tin babbitt, 125 x.



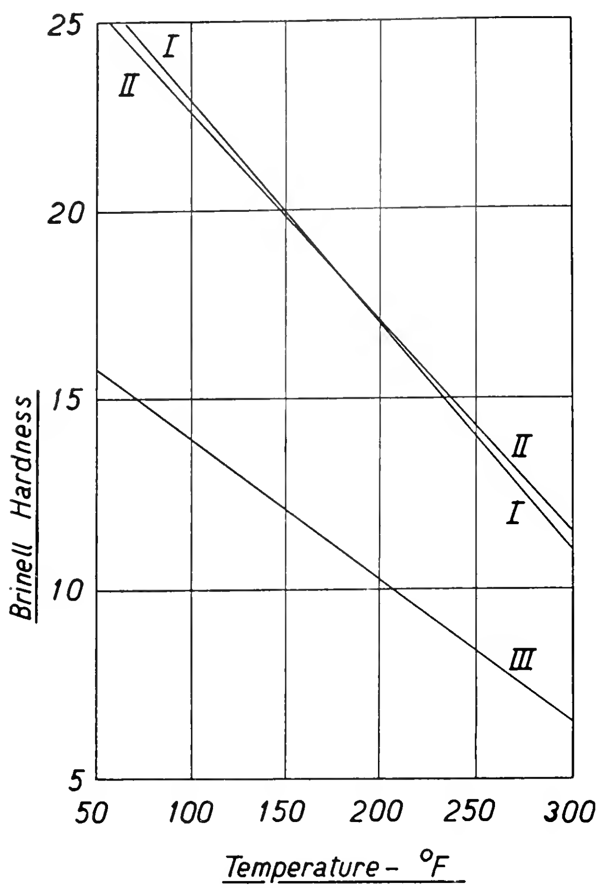


Fig. 5. Hardness change of bearing alloys with temperature.

quently used. The railroad freight car is an example. Moreover, many full bearings actually run as partial bearings. Fitting of partial bearings is permissible when the arc of contact does not exceed 60 deg. The working principles are fundamentally the same as for full bearings. However, with partial bearings the decrease of load capacity by grooving can never be offset by better cooling through richer oil flow because there is at best oil circulation within the bearing housing.

Ball and Roller Bearings

The popular name "anti-friction" bearings is a misnomer tending to obscure facts, because it makes an unwarranted discrimination between this kind and plain bearings. "Anti" means "against" and indicates the purpose of the bearings. There is no difference in that respect, and with regard to friction, not sufficient difference to warrant such a discrimination. As a matter of fact, the type in question operates with rolling contact, there being always a certain amount of slip. They have very important fields of application due to: the high loads the steel balls can carry; their low starting friction; their more uniform working friction; and the ease with which they can be lubricated. Conversely, they are very sensitive to misalignment, particularly roller bearings, and require very careful installation.

Bearing Alloys

There are some well established rules about bearing alloy performance and operating conditions. For instance, one uses a bronze bushing in the upper end, and babbitt in the big end of a connecting rod and not the reverse. Load, temperature, speed and the "running properties" (a summary expression of experience) of the materials determine that choice. Conversely, the main bearing at the gear case side of a well-known motorcycle is a bronze bushing. It works reasonably well due to the low temperature and comparatively uniform oil film formed, in spite of its 3000 rpm. Another important factor enters if we are dealing with a bushing and not with a split bearing. If there is a lining (notably a thick one), it tends to pinch the shaft at the line of split at high temperature. The example above is of general importance, showing that many factors have to be considered, some of which may differ with the case. There may be apparently conflicting experiences and yet both parties may be right.

The great variety of existing bearing alloys, discounting for superfluous versions, shows that there is no all-purpose alloy and still plenty of research and experience required. Fig. 4 shows the microstructure (125 x) of a representative whitemetal, an alloy of tin, antimony and copper.

A very common test for judging the suitability of a bearing alloy is the Brinell hardness test. The "Brinell Number" and its decrease with increasing temperature gives a rough idea of the strength of an alloy and the decrease of that strength with rising temperature. Fig. 5 shows the relationship for three bearing alloys. The information given by this test is, however, incomplete. It does not tell anything about the fatigue strength and the brittleness of an alloy. Two figures may bring out the latter point. The hardness of drawn copper at room temperature was found to be 89, that of a common lead-antimony bearing alloy was only 22. Yet, that copper may be twisted like a corkscrew, whereas a $\frac{1}{4}$ x $\frac{1}{2}$ inch thick

r of the alloy broke at a twisting gle of 45°. If fluid lubrication ould always obtain, only the me-anical strength of the lining would atter; in fact, we should not need y special "lining" at all.

hin Shells and the Principal Causes of Bearing Failure

Bearing failure is apt to occur more equently under conditions of high ad and temperature. Increasing ock loads, increase in speed and de-ease in weight per hp add to the fficulties of designer and operator.

The introduction of the thin shell bearing insert presents an instruc-e special problem. The insert it-lf is a desirable development but its anufacture and installation require rticular care. It cannot be overem-asized that a bearing insert has to manufactured and installed with e utmost precision. The part in hich the insert is installed (bed ate, conrod big end, etc.) has to absolutely smooth and clean from reign particles and so has to be the ck of the shell. It has to fit its pport as an old-time fitted bearing d to fit the shaft. Only then, pro-ded the engine is otherwise per-ct and perfectly installed, nothing arped or twisted, will the bearing properly aligned and free from nding stresses in operation. In a rge engine there will be a number such bearings. Precision of manu-cturing being limited, it is evident at all these bearings cannot possibly in mathematical alignment, to ention only one difficulty. Hence, ain the smallness of the bearing earance should not be pushed to the nit. Otherwise, some bearings are ble to be overloaded or clamped or th.

However, our principal point is w the bending stress. There are rtainly cases where bearings seize, ipe or run out due to overheating d lack of lubrication. Wear or rrosion also occur. The most fre-ent type of failure and destruction, wever, consists in or starts with acking of the lining by "fatigue." his word stands for quite a definite nd of observation, for instance, acking after bending a material in specified way, a number of times aracteristic for the material. Thus, e material will stand one million tress cycles" (for instance: bend-g back and forth), another two million, and so on, before it cracks. There occur bending, tensile and pounding stresses in bearings. Stresses below a certain amount are resisted indefinitely and the resist-ance to tensile and pounding stresses may be very different for the same material. There are very interesting relationships between the two types of stresses and crystal structure.

However, the precise basic mecha-nism of fatigue is far from being completely understood, particularly with soft alloys, nor do we know whether it is the same for all types of stresses. The wiping, overheating and further destruction of a bearing are in most cases only consequences of cracking. Any cause that in-creases the temperature contributes more or less to fatigue because the resistance to fatigue decreases as the temperature rises.

Fig. 1 is a case of utterly prepos-terous grooving which may well have started the fatigue cracks by inade-quate lubrication and overheating. Fig. 2 is a case of wiping by expan-sion as discussed earlier. Fig. 3 is above all characteristic for bending.

The alloy of the lining expands more than the shell when heated. Hence a loose lining tends to lift it-self from the more rigid shell and will flex like a poorly fitted bearing insert. Thus, it is obvious, that good bond-ing of the lining and a firm support, as well as a rigid, well-aligned shaft are all-important for the elimination of bending stresses and fatigue from that source. The hazard of pounding fatigue is lessened by a thick, cush-ioning oil film. This phenomenon seems more complicated than the for-mer in bearing alloys, because (Fig. 4) they consist of various kinds of microscopic crystals which expand differently when heated. In tin bab-bitt even the basic crystals (matrix) expand differently in different direc-tions. Hence, internal stresses within the alloy are always present and in-crease with rising temperature, and, moreover, quite naturally, some crys-tals rise from the originally smoothly machined surface. Figs. 6 and 7 show the phenomenon on two small ingots with highly polished surfaces. In practice, it means that any pounding hits at higher temperature a smaller surface and thus is more severe. The glazed spots in Figs. 1 and 3 result from that phenomenon.

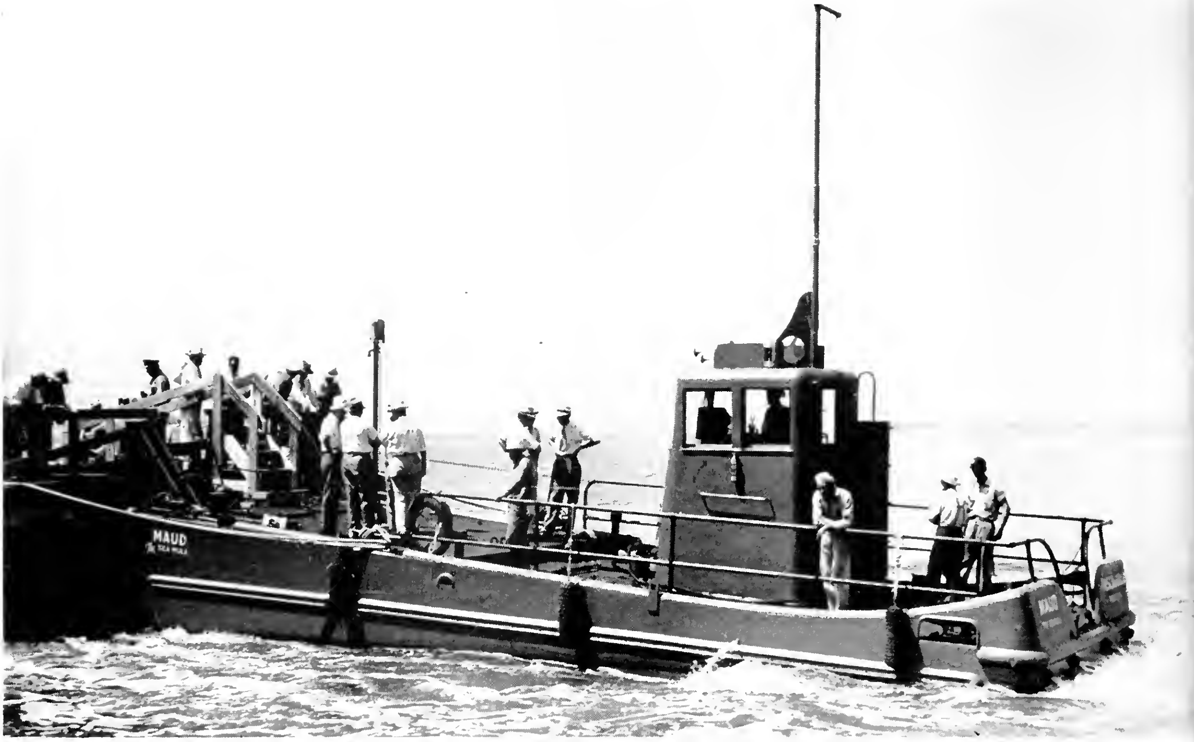
For all these reasons, high operat-ing temperatures contribute to bear-ing failure. They also promote the oxidation of the oil and corrosion of some alloys. Tin babbitt is practi-cally immune against corrosion.

Whether the described natural in-ternal stresses and their change with temperature fluctuations eventually result in fatigue cracks, without pounding, is unknown.

Summarizing: most bearings fail by fatigue which is greatly promoted by flexing and pounding. It may be in-directly promoted by any factor which impairs fluid lubrication and raises the temperature. Such factors are, notably, grooving, inadequate bearing clearance, misalignment and inadequate cooling.

Fig. 6. Reflection image of polished tin babbitt specimen at 75° F., surface smooth.

Fig. 7. Reflection image of polished tin bob-bitt specimen at 300° F., surface warped due to different expansion of the crystals.



The Ingalls Sea Mule's four engines churned the Pascagoula River into a white wake as she pushed a barge full of Army and Navy officers, Government, Ingalls and Chrysler officials on her first run. Maud went through her paces without a hitch.

The Sea Mule

Said to be the most powerful tug of her size ever built, the Ingalls Sea Mule has been inspected at the Pascagoula, Mississippi, yard of the Ingalls Shipbuilding Corporation by representatives of the British Admiralty, Russian and Chinese Governments, as well as officers and officials of the United States Army, Navy and Maritime Commission.

The Maud, as she was christened by little Barbara Ingalls, daughter of R. I. Ingalls, Jr., president of the Ingalls Iron Works Company, at Birmingham, where the workboat was built, lived up to all expectations on her trial run and during subsequent demonstrations.

Pushing a barge, the Maud went through all her paces without a hitch, demonstrating her maneuverability, speed, ease of operation and power. She turned within three lengths while pushing the barge, reversed her course and picked up speed immediately. She eased into the dock after the two-hour trial run with only a few feet to spare, showing how easily she can be handled in crowded harbors or river ports. Without a tow, she turned in her own length.

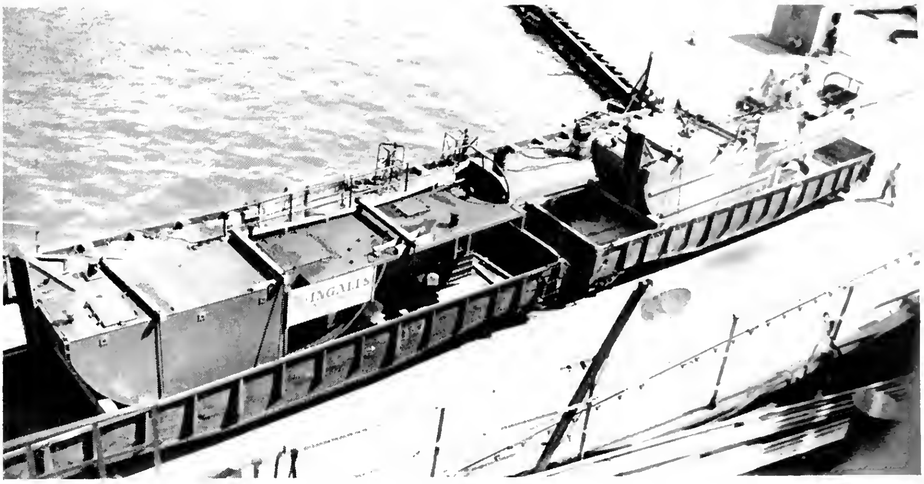
This tug was built by Ingalls in collaboration with Chrysler Corporation, which has constructed thousands of smaller workboats of similar design for use of the United States Army in combat zones all over the world.

Maud is 40 feet long, 15 feet beam, with a draft of 6 feet, and has two propellers of 60 inches diameter and 48-inch pitch, each driven by 285-hp Chrysler Royal Twin marine engines.

Of heavy all-welded steel plate construction, the hull was built in four sections, which may be assembled or "knocked down" in only a few hours to facilitate shipment on railroad flatcars or gondolas, on highway truck-trailers or on cargo ships. The first Sea Mule was shipped from Birmingham to Pascagoula on gor dolas in two sections, plus the contr tower, eliminating two steps in th assembly of the workboat at her de tination. Each of the four section is a watertight unit weighing approx mately 10 short tons, which may b repaired in case of damage withou affecting the others. Numerous sa ings are made possible through nov methods of manufacture of the unit which are completed in a fabricatio shop.

The workboat may be bolted t gether if further shipment is planne so that she may be easily "knocke down." For permanent use in a ha bor or on a river or lake, the section may be welded together. Both meth ods have proved entirely satisfactory

These new type tugs are expecte to find a large place in harbors an inland waterways, cost being a important factor. For long haul bunks and other facilities could b installed so that the crew could re

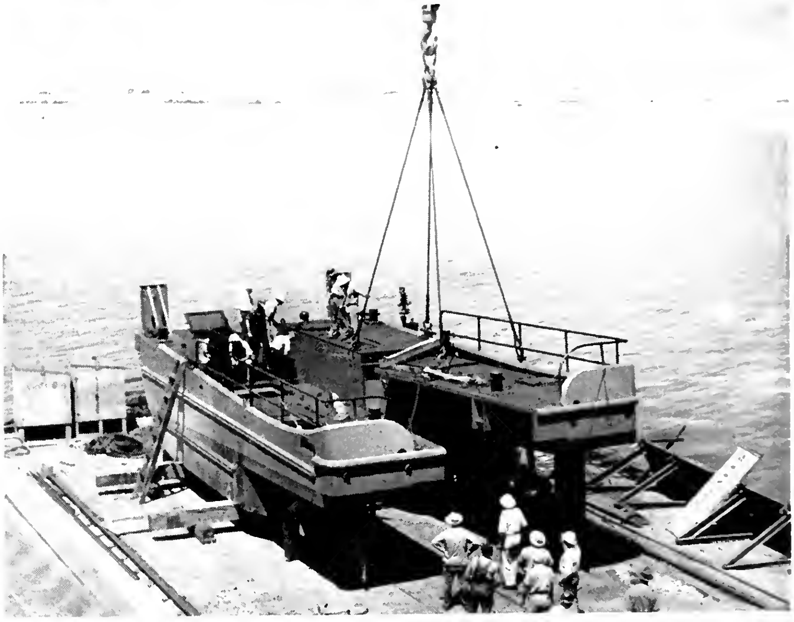


The Sea Mule, most powerful marine tug of her size, may be shipped in two sections of four, plus the control tower. The first Sea Mule was shipped from Birmingham, Alabama, to Pascagoula, Mississippi, on gondolas, as shown here.

main aboard at all times. This type of construction should be ideal also for harbor fire-fighting craft.

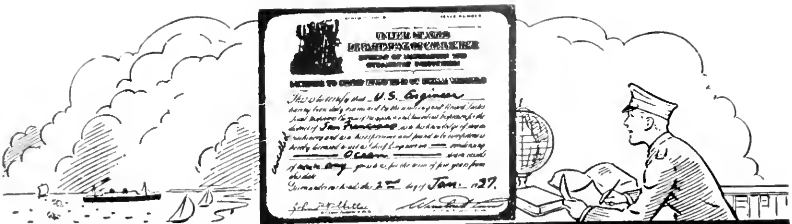
The first Ingalls Sea Mule is powered with gasoline engines. Either gasoline or diesel may be used. There are two gasoline tanks, holding 800 gallons each, enough for 50 hours' operation.

Automatic hydraulic steering and engine control is fitted. The forward and reverse gears also are hydraulically controlled through clutches in the control tower, slightly aft of amidships on the center line. Any one or all of the engines may be started or stopped by these remote controls.



The boat was assembled in less than half a day by a crew that had never had practice in putting together this type of craft.

Ships and boats usually slide down the ways stern first or sideways, but this one is launched vertically. Lifted by cranes, she hit the water from "out of the clouds."



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco 11, California

ELECTRIC DRIVE TANKERS

525-kw Auxiliary Sets

Initial Starting

Before starting the machine for the first time:

(1) See that the voltage (and frequency for a-c machines) on the name-plate corresponds with the line voltage and frequency.

(2) In the case of d-c machines, check all connections with the wiring diagram and the polarity of all poles and circuits in order to insure the proper direction of rotation. (The brushholders are usually set for only one direction of rotation, and operation in the wrong direction will result in damage to the commutator and brush gear, overheating of the commutator, or improper functioning of the brushes. For a-c machines check phase rotation.)

(3) Examine the interior of the stator frame, the armature, the slip rings for commutator, the air gap, and the spaces between the poles for loose objects, bolts, nuts and tools. Use a magnet to remove all small metallic particles.

(4) Make sure that all moving parts have sufficient clearance from the nearest stationary parts. Pay particular attention to the clearance between the pole faces and the armature, the brushholder brackets and the commutator, and the brush rigging and the commutator leads.

(5) Inspect all electrical clearances, particularly where bare conductors of opposite polarity approach each other.

(6) Bend the br[illegible] away from each other.

(7) The air gaps should be equal as measured under poles of the same type, and poles should be uniformly spaced.

(8) Clean out commutator slots to prevent bridging between segments. Check for dirt, foreign material, burrs and mica pins in undercutting commutator.

(9) The armature clips (d-c machines) on both ends are easily bent out of shape when handling. See that these leads are straightened and uniformly spaced before starting. Bent windings may contribute to mechanical vibration as well as being dangerous to insulation.

(10) Before putting the machine into service, it is desirable to operate without load long enough to determine that there is no unusual localized heating.

Maintenance of Generator and Exciter

The machines should be inspected at regular intervals, observing such matters as cleanliness; condition of brushes, commutators, and collector rings; bearing, oil wells; bolts; commutation; and general heating.

Cleanliness

The interior and exterior of the machines should be kept free from metal dust, dirt of any kind, oil, and water. An accumulation of dirt inside the armature and in the armature air ducts may eventually ground the armature and burn it out. The brackets and leads of the machines should be carefully wiped to remove all traces of metal dust worn from the commutator, and the brushes and brushholders should be cleaned. Low-pressure compressed air or a small bellows may be used to blow out loose dirt or lint, but high-pressure air should not be used because of the possibility of driving dirt and small metal particles into the windings and thereby injuring the insulation. A vacuum cleaner makes an ideal cleaning medium.

Adjustment of Brushes

The commutators and collector rings should maintain a polished surface. Blackening of all of the bars of an exciter commutator indicates poor adjustment of the commutating field or incorrect brush pressure. Blackening of groups of bars at regular intervals may be caused by the same conditions, or caused by poor brush contact. Blackening at irregular intervals indicates a rough or eccentric commutator. Noisy brushes are caused by a rough commutator or too much clearance between the commutator and the brushholder. Do not use any lubricant on the commutators.

When a commutator is rough but not eccentric, it is possible to stone it smooth with sandstone and finish with sandpaper instead of turning it down. Stoning is difficult and often harmful when the machines cannot be operated without considerable vibration. When the commutator is too rough to be stoned down by hand, the stone may be held in a rigid tool post, but better results may be obtained by using a revolving wheel grinder. Extreme care should be used to keep copper dust out of the windings. The interior of the machine and the windings should be carefully blown out before returning to service.

In some cases it may be necessary to use a cutting tool. While doing such work, provision must be made to prevent dust and chips reaching the interior of the machine. When the commutator is true, it should be smoothed and polished with very fine sandpaper, and the slots between the segments cleaned.

If the mica appears to be flush with the bars, groove it below the surface at least 1/32 in., using a grooving machine or a piece of hacksaw blade. When grooving a commutator, be

sure not to leave fins of mica along the sides of the groove.

All of the bushholders should be at the same distance from the commutator; this distance should not exceed 3/32 in. or be less than 1/16 in., and the toes of all brushes on one stud should line up with the edge of one segment. When new brushes are installed, they should be fitted to the commutator by sanding with medium or fine sandpaper; do not use emery or carborundum. Do not let carbon dust collect on the windings.

The brushes should move freely in the holders and make firm and even contact with the commutator or collector ring. The brush pressure should be about 2 pounds per square inch.

To prevent the wearing of grooves in the commutator, the brushes should be staggered in pairs. A pair consists of a set of positive brushes and a set of negative brushes. Preferably the brushes on all positive studs should be staggered with reference to those on the negative studs.

The brushes should be evenly spaced around the commutator. To check their spacing, set the studs with brushholders in place and warp a piece of paper about one inch wide once around the commutator. Mark the point where the paper laps. Remove the paper, spread it out on a flat surface, and divide the space between the end and the marked lapping point into as many equal divisions as there are main poles in the machine. Replace the paper around the commutator and adjust the brushholders until the toes of the brushes just touch these marks.

Testing and Drying Out Windings

If the windings of a machine have absorbed moisture, either by being flooded or by standing idle in an atmosphere of very high humidity, the machine should be dried out before being placed in operation again. Moisture reduces the dielectric strength of the insulation and a breakdown might result if normal voltage were applied to a machine with water-soaked insulation. New machines will not normally have to be dried out unless they have been exposed to unusually damp conditions.

In determining whether or not sufficient moisture is present in a machine to require drying out, resistance measurements of the insulation can be used. But judgment should be used in interpreting the values obtained because temperature and dirt on the windings as well as moisture affect the insulation resistance. A low value of insulation resistance does, however, indicate that a machine needs attention, either drying or cleaning or both.

Measurement of Insulation Resistance

The simplest method of measuring insulation resistance is to use a "megger," which indicates the resistance directly in megohms. If a megger is not available the voltmeter method may be used. The procedure is as follows:

A direct-current voltmeter and source of constant direct-current potential somewhere between 125 and 500 volts are used. The exact value of voltage used is unimportant, but if values of insulation resistance are to be compared over a period of time it is important to use approximately the same voltage each time the measurement is made. The resistance will vary with the voltage used, being lower for the higher voltages.

Before using power from any circuit for this test, determine whether the supply circuit is grounded. Connect first one side and then the other to ground through a single lamp for 125 volts or a bank of four lamps in series for 500 volts; if either side causes the lamps to light, the circuit is grounded. The ungrounded side should be connected in series with a voltmeter to the windings of the machines, and the grounded side should be connected to the frame of the machine being tested. The circuit should be protected with a fuse having a capacity of 5 to 10 amperes. An incandescent lamp may be substituted for the fuse if more convenient.

With the testing-circuit line switch open, read the voltage of the testing circuit. Then close the line switch and read the voltmeter connected between the ungrounded side of the line and the windings of the machines. The insulation resistance of the windings is then calculated from the following formula:

$$Rx = Rv \left\{ \frac{E}{E_1} - 1 \right\}$$

where E = voltage of d-c testing circuit;
E_1 = voltmeter reading when connected in series with the winding whose insulation resistance is to be measured;
Rv = resistance of voltmeter in ohms;
Rx = insulation resistance in ohms.

The insulation resistance at normal operating temperatures should be at least that given by the formula:

$$R = \frac{\text{Normal terminal voltage} \times 3}{\text{Rated KVA} + 1000}$$

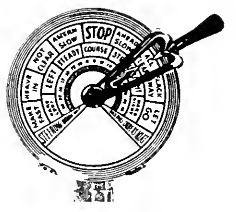
If necessary, dry out the machine. Place the machine in an oven and bake at a temperature not exceeding 90 C until the insulation resistance becomes practically constant. Fair results can be obtained by enclosing the motor with canvas or other covering, leaving a hole at the top to permit moisture to escape, and inserting some heating units or lamps to heat the air within the enclosure.

An a-c machine may also be dried out by passing a current at low voltage (rotor locked) through the stator windings. Increase the value of current gradually until the winding temperature as measured by thermometer reaches 90 C; do not exceed this value.

A d-c machine field may also be dried out by passing a direct current at low voltage (generator at rest) through the field windings that will raise the temperature to a value not exceeding 90 C. This temperature should be reached gradually and the entire winding should be heated as uniformly as possible. Armature windings may also be dried by operating them with the armature short circuited at the machine terminals through an ammeter. The shunt field should be separately excited and the commutating field in the circuit. The armature current should be limited to a value that will not produce injurious commutation, and in no case exceed normal value. Current should never be passed through a d-c armature when stationary, as there is danger of locally overheating the commutator risers.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

Safety at Sea

Deck officers are responsible for the practice of safety rules at sea and for that good housekeeping with respect to deck gear which is so essential to safe working conditions in handling cargo and working ship. Most American ship-operating firms have safety committees, and it is essential that all deck officers keep their eyes open and their minds alert for suggestions as to better ways of maintaining safe working conditions. We present herewith an outline of safety as built into Maritime Commission vessels. This material is from an address before the National Safety Council by David Currier.

Safety Rules

In an endeavor to improve the safety conditions on board ships, the Maritime Commission has made a survey of existing safety rules and regulations as promulgated by various domestic and foreign bodies. These rules deal with stevedoring regulations, crew working spaces and accommodations, passenger accommodations and rigging.

These various and sundry rules and regulations have been embodied in a new set of rules by the Maritime Commission and as such are being used as a basis of safety design for vessels under construction by the Commission.

It should be noted, however, that these new rules are not the limit of safety and that additional safety factors are embodied in new construction as fast as is found practical.

Time does not permit the discussion in detail of these items, and I will just mention a few.

Non-slip treads are being installed at the top and bottom of all stairs, in the passage outside of all refrigerator doors and any other place where they are felt to be necessary.

Non-slip tile is being specified and installed in the galley and all pantries.

Doorsills are being reduced to a minimum to eliminate another possibility for accidents, and door heights are being standardized for the same reason.

The Commission is installing additional lighting facilities and painting the holds with aluminum paint. This increased lighting and painting of cargo holds not only results in better working conditions but tends to cleaner holds. Better lighting and brighter working facilities will be an incentive for preserving the cleanliness of the vessels.

Cargo Handling and Testing of Cargo Gear

The Maritime Commission has led the way in setting new standards of safety in the handling of cargo on our modern freighters. Specifications for all cargo gear on new vessels require a large factor of safety in respect to strength, and severe overload tests are required on the gear before the ships are put into service. As a further safety measure, the allowable working lift is plainly marked on each cargo boom to prevent accidents caused by ignorance.

The test requirements for booms, blocks, wire rope and assembly tests for same are certified to by representatives of the manufacturers, shipyard and Maritime Commission, and copies of the certifications are furnished each vessel in form called "Register of Cargo Gear." This form has been accepted by other Maritime nations as indicating that the cargo gear meets with their own regulatory requirements.

Electric winches for handling the booms are provided with both power-operated and hand-operated brakes so that the load can still be controlled even though the electric power should fail.

Weather Deck Hatches

In order to reduce the possibility of loss of vessels due to heavy weather conditions stoving in the forward weather deck hatches, it has been found advisable to use metal hatch covers. These covers are of types similar to pontoon or "Tutin" hatch covers, and are required by the Commission to be installed on at least No. 1 and No. 2 hatches on the weather deck.

It is felt that this type of cover is a distinct improvement over the old type wood hatch covers.

Wireless

The U. S. Maritime Commission vessels have radio equipment that can be used both for ship-to-ship and ship-to-shore for the sending and receiving of messages.

Federal and International rules require radio communication for vessels on the seas. The Commission's vessels have complied with all requirements and in some instances have gone a little farther in anticipation to future requirements and good communication practice.

The radio equipment consists of one main, one emergency, and one high frequency transmitter and receiver. There is also one additional emergency receiver to be used when the other two receivers fail, and capable of receiving signals over the same wave band. Vessels which come under the classification of cargo vessels are required by law to have only one radio operator, provided there is an automatic means to intercept S.O.S.

.lls. This automatic device is known ; an auto alarm. The auto alarm is a dio receiver together with electrical ıd mechanical equipment so de- gned to intercept an S.O.S. distress gnal which would give an alarm the radio-telegraph operating ɔom, in the radio operator's cabin, ıd on the navigating bridge.

When the alarm has been sounded, .e radio operator immediately con- cts the sender of the distress signal locate his position so that rescue help can be given.

In addition to the above radio ıuipment, there is a device called e "Direction Finder." This instru- ent is used to obtain the direction the sending station. It is also used get the direction of other vessels fog, and direction of vessels in dis- ɛss.

For passenger vessels the power lifeboats have installed, in a water-tight compartment, a radio-telegraph equipment consisting of transmitter, receiver, antenna, batteries and auxiliaries.

The source of power supply for the radio equipment is electrical current furnished by a main feeder from the main switchboard, and if the main supply fails, there is an emergency generator which automatically starts and furnishes current for emergency lighting and power for other emergency equipment in addition to supplying power to an auxiliary radio feeder from the emergency switchboard. There is also a storage battery with capacity for emergency illumination of radio room and operating the emergency installation so as to provide a normal transmitting and receiving range of at least 100 nautical miles continuously for six consecutive hours.

School for Cooks a Success

By Mozelle Milliken

Four hundred men trained as mari- ne stewards, cooks and bakers, and w sailing the high seas in the gal- ys of America's Liberty ships; 400 ecialists in a vital service as a re- lt of training received at San Fran- co Junior College.

This is the story of one wartime complishment during the past year.

Just one year ago, **Pacific Marine view** published an account of the ar Production Training Program en being undertaken at the college d designed to train and upgrade agoing men in the culinary arts.

Today throughout the seven seas ousands of service men and mer- ant seamen are eating meals pre- red by these trainees according to antity recipes which they learned interpret under expert instruction the college kitchens.

Months ago, with the great in- ease in our merchant fleet, the U. Maritime Commission foresaw the ed for experts to prepare and serve ods on board the new ships. roughout the country where fa- ities were available, training classes re organized in this field. Nowhere, cording to local maritime authori- s, has such training been more successful than at San Francisco Junior College.

Available for the purpose were the equipment, administrative facilities, and teaching staff of the former hotel and restaurant program which previously had been offered to young college students who planned a career in that industry. Conversion to the war effort was but a matter of conforming to Government procedures.

Students admitted under Federal direction are those assigned to the course by the local offices of the U. S. Maritime Service. Applicants must be men of previous experience at sea, preferably in the steward's department. Length of training is determined by aptitude and previous skills. The men are paid by the Government while in training.

During the year many types of students have been enrolled, from the French sailor whose ship by vote of officers and men had voluntarily become a part of the U. S. merchant fleet in a distant port, and who learned his English along with his cooking, to the survivor of a torpedoed U. S. tanker, picked up from a lifeboat somewhere in mid-ocean.

The number of enrollees is limited, and men are admitted only as places are left vacant by those assigned to ships after completing their program, which has included thorough training in range work, baking and meat cutting — this latter course being given in the plant of a local meat-packing house by regularly assigned instructors.

Direction of the course is headed by Mrs. Hilda Watson of the local War Production Training Office, who formerly headed the college department as its chairman.

BOOK REVIEWS

Questions and Answers for Deck Officers, by Haakon Norby, Master Mariner; 422 pages, pocket size (illustrated); published by McGraw-Hill, Whittlesey House, New York City; price $3.50.

The author had in mind, when he wrote this book, an examination guide and review designed for prospective deck officers. It serves this purpose if the student learns the answers to the questions contained, for these questions are typical of those given by the examining boards on the Atlantic, Pacific and Gulf Coasts

The book is divided into three parts; the first contains questions common for all grades, but primarily for third mates; the second pertains to problems of second mates, and the third especially to chief mates, as this examination is often the most difficult to pass. It also contains a review of examinations as well as many questions on practical ship construction, cargo, ship's business, rules and regulations, and the like.

The Enemies' Fighting Ships, by Jay Launer; 222 pages; published by Sheridan House, New York City; price $3.75.

The naval strength of the Axis, both in story and data form, gives the reader of this book as complete a picture as is possible, under wartime conditions, of the fighting ships we battle. It is a good book for civilians as well as for officers at sea, as it shows how to recognize the silhouettes of enemy warships. A complete index and a war log section are included, the latter of which gives the fate of the major battle-wagons.

Keep Posted

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

100,000th Diesel

The 100,000th Series 71 6-cylinder 2-cycle diesel engine manufactured by the Detroit Diesel Engine Division of General Motors Corporation was recently dedicated to the late Frank Knox, Secretary of the Navy, by W. T. Crowe, general manager of the company. The power plant was presented to the U. S. Navy by C. F. Kettering, vice president of General Motors Corporation, and was accepted for the Armed Forces by Rear Admiral H. G. Taylor.

A celebration in honor of the dedication and delivery of this engine was witnessed by Detroit Diesel employees as they pledged to buy bonds in the 5th War Bond Drive in an amount equal to the purchase price of an LCI boat.

Also participating in the dedication and war bond pledge were R. K. Evans, vice president of the General Motors Corporation; V. C. Genn, sales manager of Detroit Diesel; Frank Isbey, head of Detroit's Fifth War Loan Drive; and James Fargo, union representative.

Upper photo shows the 100,000th G.M. diesel landing craft engine being dedicated to the late Frank Knox. It was accepted for the Navy by Rear Admiral H. G. Taylor. At left, W. T. Crowe, general manager of the Detroit Diesel Engine Division; right, C. F. Kettering, vice president, General Motors Corporation.

Lower photo shows employees of Detroit Diesel Engine Division delivering the engine and pledging to buy War Bonds equal to the purchase of an LCI boat.

The 100,000 engines delivered to date represent power for propelling the Navy's LCI boats, each of these craft being driven by eight Series 71 6-cylinder engines, in the form of two Quads, with two single sixes reserve to replace a damaged un The Quad, designed by Detro Diesel engineers, is a unique com bination of four standard 6-cylind engines coupled to a single propell shaft, thus increasing horsepow fourfold, with important reductio in weight and space.

In addition to the LCI, other lan ing craft such as the LCVP, LCT ar LCM are successfully powered by th standard 6-cylinder engine in vario combinations, and as Rear Admir E. L. Cochrane, U. S. Navy Chief the Bureau of Ships, said recentl "the small number of casualties actual landings of armed forces h been in no small measure due to th reliability of performance of the GI diesel engine which has powered th great flotillas of landing barges."

In 1938 the company produce only 800 engines, with this figu growing to 10,000 for the year 1941. Today the plant has been vas ly increased as to size and personn and is turning out engines at a ve

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high rate. In addition to driving America's landing craft, several thousand Detroit Diesel engines in one, two, three, four and six-cylinder sizes furnish motive power for the famed M-3, M-4 and M-10 tanks, trucks, tractors, bulldozers and buses, and for many other applications contributing to the success of the war effort.

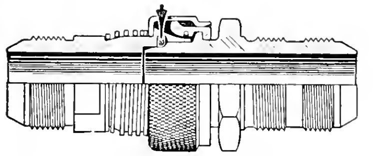
New Quick Coupling

The illustration shows one of the new line of Wiggins quick couplings developed for use on fuel, oil, instrument and air lines on aircraft, for which many marine applications have been found. To disconnect the couplings, simply pull back the knurled ring—connection is made by pushing the two ends of the coupling together and sliding the ring forward.

The new model incorporates a "4-way" seal of synthetic rubber which is completely out of the line of flow, and insures a pressure drop no greater than that in an equal length of tubing.

This design eliminates all critical edges whose damage might impair the seal, and is much lighter and more compact than previous models.

All lines requiring periodic disconnection will benefit by incorporating a Wiggins coupling as a time-saver and also because the life of the coupling exceeds that of threaded aluminum or brass fittings by several hundred per cent, it is stated.



New quick coupling.

This new design is available for line sizes from 1/4" to 2" for connection to hose, tubing or pipe. Other models of threaded or flanged couplings are available for 3/4" to 10" lines.

These quick couplings are distributed on the Pacific Coast by the Johnson Specialty Company of Wilmington, and the Brooks Equipment Company of California, with offices in Los Angeles, San Francisco, Portland and Seattle.

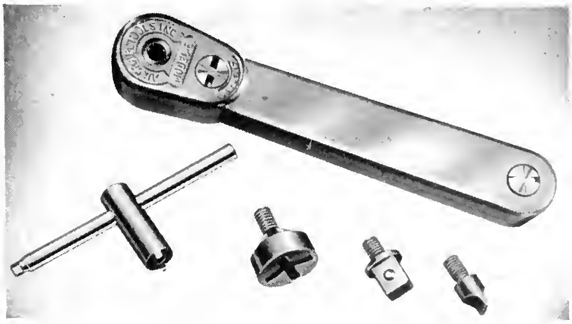
Unique Torque Wrench

A new torque wrench of simplified construction which can't overtighten in operation, and combines right-and left-hand torque in one wrench, is announced by Aircraft Tools, Inc., Los Angeles.

The wrench is full rachet so that when desired tension is reached positive break-away occurs one notch at a time, thus preventing slam. Torque is set in specified inch pounds. Adjustments ranging from 10 to 60 pounds can be made on the job, but only by the use of a special wrench furnished with the tool.

Features of the new wrench include compact size and light weight (11½ ounces) for hard-to-reach jobs. Long life and positive adjustment are assured, since all torque load is carried on precision ball bearings and heat-treated tool steel parts, packed in grease. Spring fatigue is cut to the minimum, as torque spring is in repose except when in use, and the high-grade spring assures accurate torque. All parts of the wrench are interchangeable.

Unique torque wrench.



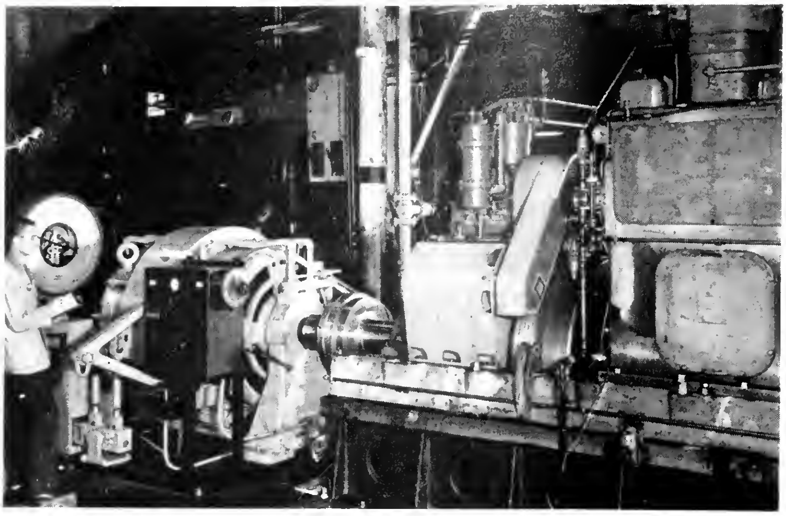
Special Gear Steers Navy's LST Craft

At the stern of every Navy LST so far engaged in any of our far-flung amphibious operations is a rugged, ingenious quadrant steering gear designed and built by Baldwin Southwark Division of The Baldwin Locomotive Works. Standard Steel and Cramp, two other Baldwin divisions, contributed castings and forgings which went into the construction of these gears.

The steering gear, located below deck in a special compartment just above the rudders, is operated by an electric motor under remote control from the wheel on the bridge. The steering wheel may be set for any desired angle, and when the rudders reach this angle the motion of the gear is automatically stopped and the rudders held in position until another change is called for.

The Navy LSTs are approximately 320 feet long and are extremely seaworthy. They carry a crew of 57 and a large number of tanks in addition to much other material. To carry out their invasion sorties successfully, they must have high maneuverability, which is afforded by multiple rudders operated by this electrically-powered quadrant gear.

Up on the bridge of every Navy LST now in service, a touch of the wheel electrically transmits motion to the precision steering gear designed and built by Baldwin Southwark Division of The Baldwin Locomotive Works. Baldwin is maintaining a high rate of production on this vital Navy equipment, according to Ralph Kelly, president of the company. The gear can be hand-operated in the event of power failure. Photo shows quadrant arc in which gear swings, as well as the long steel arms which transmit the movement of the gear to the rudders.



G-E water-cooled inductor dynamometer coupled to Enterprise marine supercharged diesel engine.

Diesels Get Ten-Day Tests

Helping to speed production of supercharged diesel engines for harbor and seagoing tugs, mine sweepers, net tenders, and for many other marine and industrial uses, is this General Electric inductor dynamometer at the Enterprise Engine and Foundry Company, San Francisco. The dynamometer is shown here putting a 1000-horsepower diesel engine through a ten-day test under simulated operating conditions.

During the test period, each diesel engine is loaded to any desired degree simply by turning a rheostat dial on the G. E. dynamometer control panel. The dynamometer is capable of absorbing up to 3500 horsepower over a range of 850 to 2500 revolutions per minute. When the diesel engine is being tested, the operator takes readings from the automatic scale and from a speed-indicating tachometer. These readings serve as the basis for calculations of the horsepower being developed by the engine at different speeds.

An interesting job recently under way at Enterprise includes a number of 1000-horsepower diesel engines to be direct connected to 650-kilowatt General Electric generators for service with the United Nations abroad.

• • •

Non-Metallic Industrial Heating

Almost any non-metallic material can be heated uniformly throughout and in minutes where ordinarily it requires hours, with the new Thermex high-frequency heating equipment. Heating is accomplished within the article or molecule itself by reason of its molecular resistance to the high-voltage, high-frequency current passed through it from flat electrode plates covering opposite sides or top and bottom of the mass to be heated. All coils, tubes and controls are housed with a compact safety cabinet, certain models of which are portable and mounted on casters. Any average workman can be trained to operate the largest units; simplest units have single-knob control. Equipment is extremely efficient in its transformation of electric current energy into heat energy, improves quality of product, increases production, simplifies auxiliary equipment and saves floor space. It is extremely flexible.

This method is already thoroughly established in the wood-working or wood-fabricating field, where it is revolutionizing the processing of plywoods and laminated woods used in airplane and ship construction. There are many other successful applications. Extensive modern laboratory facilities are available for making test applications under simulated operating conditions, and large production facilities exist for manufacture at The Girdler Corporation, Thermex Division, Louisville, Ky.

Non-metallic industrial heating.

Portable Sound System

A portable sound system with self-contained power supply is being manufactured and marketed by the Newcomb Audio Products Company of Los Angeles. The complete system, easily carried by one person, weighs only 39½ pounds, including microphone, amplifier, power supply and loudspeaker. In contrast to its compact size, this apparatus creates high acoustic output (approximately 95 decibels at 100 feet) with low battery consumption. A special press-to-talk switch in the microphone handle automatically connects the power supply only when commands or "speech" are required. Power requirements are thus reduced approximately 85 per cent during stand-by periods.

Satisfactory reception has been reported under average conditions, at sea up to 2 miles, on land up to ½ mile, dependent upon conditions. Even greater distances are often reported.

For use in ship-to-ship communication, the unit is considered especially valuable by the merchant marine—ideal for any naval operations, particularly where the use of radio is dangerous. It is adaptable in any situation that requires vocal control over large crowds or great distances.

Portable sound system.

Cooper-Bessemer on Fighting Ships

A recent survey of Cooper-Bessemer war contracts from government agencies has revealed that this firm is producing diesel engines and generating sets for over 25 different types of fighting ships and supply vessels for the Navy, Army, Coast Guard, Maritime Commission and Lend-Lease Authorities.

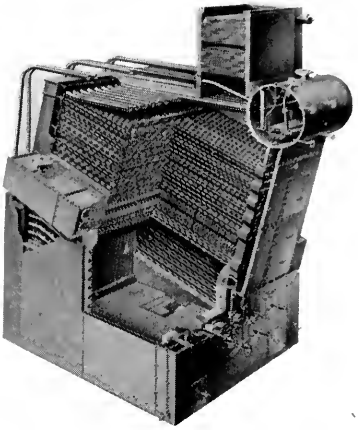
The wide variety of ships which carry Cooper-Bessemer equipment includes such diversified types of craft as battleships and aircraft carriers, converted coastal yachts, and torpedo testing barges.

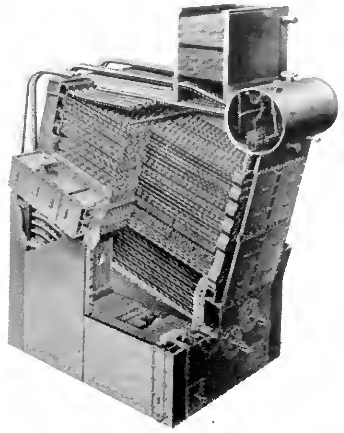
The outstanding production being accomplished at the company's plants is indicated in letters received by the corporation, complimenting them on their prompt deliveries of contract orders. One such letter recently received from the New York Shipbuilding Corporation, Camden, N. J., expressed their appreciation of Cooper-Bessemer's cooperation in helping them "render services of incalculable value to the nation."

The New York Shipbuilding yards have done a particularly notable job during the past 12-month period by turning out 146 vessels, including the famous battleship "X," now revealed to be the U. S. S. South Dakota, a number of cruisers of the Cleveland class, several airplane carriers, and over 100 of the larger types of landing craft.

In thanking the New York Shipbuilding Corporation for their warm tribute, B. B. Williams, chairman of the board of Cooper-Bessemer, wrote, "We are proud to share in your remarkable production achievement. From all reports, many of your ships are certainly giving a grand account of themselves in our far-flung battle zones. We deeply appreciate your letter of commendation."

The company's two plants are also supplying compressors, steam cylinders, shell nosing dies and machine tool castings for the war effort.





BOILER UNITS FOR VICTORY SHIPS

Boiler units as designed and built by Combustion Engineering for AP-3 and AP-2 Victory ships. Identical in overall design, the unit on the left for AP-3 ships is four sections wider than the AP-2 unit on the right.

New Synthetic Adhesive

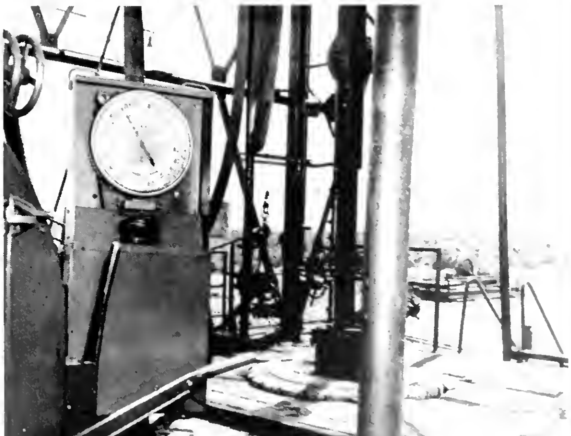
Announcement of a new synthetic resin, a low-temperature-curing adhesive of the phenol-formaldehyde type for bonding a wide variety of heavy lumber and timber constructions, is made by the Resinous Products & Chemical Company of Philadelphia. Known as Amberlite PR-75-B, this new resin is useful in the manufacture of oak ship keels and laminated structural members for columns, timbers, arches and trusses, and is proving especially adapted to aircraft work, such as wing and fuselage assembly gluing, hollow spar construction and scarf jointing.

It is supplied as a viscuous reddish-brown solution, which is dilutable with alcohol and can also be diluted with water to any practical spreading consistency needed. Amerlite PR-75-B has a storage life of a year at room temperature. It is used with Catalyst P-79, which is added at the time of use to effect proper cure. The cured glue line exhibits a pH in the range 6-7 and meets the strength and durability requirements of Army-Navy Specification AN-NN-P-511b (Plywood, Aircraft, Flat Panel), as well as the strength, durability and acidity requirements of Bureau of Ships Specification 52-G-12 (Interim) (Glue, Phenol-Formaldehyde, Low-Temperature Setting) and the new Army Air Force Specification 14124 (Glue: Low Temperature Setting).

Preparation of the glue is a relatively simple operation, requiring no special equipment nor unusual techniques. The resin solution is first weighed into a suitable container, the catalyst is then added, and the mixture is stirred until the catalyst is uniformly dispersed. Water at normal room temperature is added to the mixture, and after brief stirring the glue is ready for use.

"SEALTIGHT" DRILLING CONTROL INSTRUMENT

To Martin Decker Corporation of Long Beach, manufacturers of crane weight indicators, which are widely used in our shipyards, goes the honor of having their "Sealtight" drilling control instrument used by Phillips Petroleum Company in drilling the deepest well in the world (depth 15,042 feet) at Fort Stockton, Tex.



On the Ways — SHIPS IN THE MAKING

May's Shipbuilding Record

The nation's merchant shipyards continue to maintain their production pace, officials of the Maritime Commission said in announcing that 155 vessels of 1,537,915 deadweight tons delivered in May boosted the year's total to 719 ships with a combined deadweight tonnage of 7,247,557.

The J. A. Jones Construction Co., Inc., at Panama City, Fla., produced six Liberty ships—the first of the six-way yards to deliver a vessel from each of its six ways in one month.

More Victory ships joined the merchant fleet, with 16 delivered in May, six more than were produced the preceding month.

Curtailment in the Liberty ship program was evident in a drop from 79 delivered in April to 67 delivered in May. At the same time, delivery of long-range tankers jumped from 17 to 21, and the Maritime yards built 23 special type vessels for the armed services.

West Coast yards delivered 68 vessels, 45 were delivered from East Coast yards, the Gulf Coast delivered 32, and yards in the Great Lakes produced 10.

West Coast yards built 686,291 deadweight tons, which was 44.6 per cent of the total tonnage for the month of May. There were 494,986 deadweight tons built in Eastern yards, or 32.2 per cent. Gulf Coast yards produced 337,823 deadweight tons, or 22.0 per cent; while the 18,815 deadweight tons built in the Great Lakes was 1.2 per cent of the total tonnage.

The number and types of vessels built by all yards during May follow:

Shipyard	*No of Vessels*	*Type of Vessel*
Alabama Dry Dock & Shipbuilding Co.	4	Tankers
Barrett & Hilp	1	Concrete Barge
Bethlehem-Fairfield Shipyard, Inc.	12	Libertys
Bethlehem-Sparrows Point Shipyard, Inc.	1	Special Type
California Shipbuilding Corporation	1	Liberty
California Shipbuilding Corporation	6	Victorys
Concrete Ship Constructors	1	Concrete Barge
Consolidated Steel Corporation, Ltd.	3	C-1 Cargo
Delta Shipbuilding Co., Inc.	4	Libertys
East Coast Shipyards, Inc., Bayonne, N. J.	1	Special Type
General Ship & Engine Works, East Boston	1	Seagoing Tug
Globe Shipbuilding Co., Superior, Wis.	1	Special Type
Gulf Shipbuilding Corporation	1	C-2 Cargo
Houston Shipbuilding Corporation	8	Libertys
Ingalls Shipbuilding Corporation	1	C-3 Cargo
Ingalls Shipbuilding Corporation	1	Coastal Cargo
J. A. Jones Construction Co., Brunswick, Ga.	3	Libertys
J. A. Jones Const'n. Co., Panama City, Fla.	6	Libertys
Kaiser Cargo, Inc.	4	Special Types
Kaiser Co., Inc.	3	Special Types
Kaiser Co., Inc., Swan Island, Portland, Ore.	6	Tankers
Kaiser Co., Inc., Vancouver, Wash.	5	Special Types
Leathem D. Smith Shipbuilding Co.	2	Special Types
MacEvoy Shipbuilding Corporation	2	Concrete Barges
McCloskey & Co., Tampa, Fla.	1	Concrete Cargo
Marinship Corporation	4	Tankers
Marinship Corporation	1	Special Type
Moore Dry Dock Co., Oakland, Calif.	4	C-2 Cargo
North Carolina Shipbuilding Co.	4	C-2 Cargo
New England Shipbuilding Corporation	8	Libertys
Oregon Shipbuilding Corporation	10	Victorys
Pendleton Shipyards Co., Inc.	1	Coastal Cargo
Pennsylvania Shipyards, Inc., Beaumont, Tex.	1	C-1 Cargo
Pennsylvania Shipyards, Inc., Beaumont, Tex.	1	Coastal Cargo
Permanente Metals Corporation	17	Libertys
St. Johns River Shipbuilding Corporation	3	Libertys
Southeastern Shipbuilding Corporation	3	Libertys
Sun Shipbuilding & Dry Dock Co.	7	Tankers
Walsh-Kaiser Co., Inc.	2	Libertys
Walsh-Kaiser Co., Inc.	1	Special Type
Walter Butler Shipbuilders, Inc., Duluth, Minn.	5	Coastal Cargo
Walter Butler Shipbuilders, Inc., Superior, Wis.	2	Special Types
Western Pipe & Steel Co., San Francisco	2	Special Types

Going down the ways at the Alameda shipyard of Bethlehem-Alameda Shipyard, Inc., is the U. S. S. Admiral E. W. Eberle.

Speedy Troop Transport Launched

On Wednesday, June 14, the U. S. S. Admiral E. W. Eberle was launched at the Alameda Yard of Bethlehem-Alameda Shipyard, Inc. This is the fourth of these new, speedy troop transports constructed at the yard, rated among the largest commercial vessels ever built on the Pacific Coast.

Sponsor for the vessel was Mrs. Earl Warren, wife of Governor Earl Warren of California.

The vessel is named in honor of Rear Admiral E. W. Eberle, who served for 43 years in the Navy, holding many posts of honor and responsibility, including that of Chief of Naval Operations from 1923 to 1927. As a lieutenant he shipped aboard the U. S. S. Oregon, serving for three years on that famous battleship, making the historic cruise

around the Horn in the Spanish-American War and commanding her forward gun turret at the battle off Santiago, Cuba. Another vessel of the U. S. Navy has been named in honor of Admiral Eberle—the destroyer U. S. S. Eberle, commissioned in 1940.

The troop carrier is designed and built with the view to conversion to a luxury passenger liner after the war. Figures about the troop-carrying capacity and speed of the ship are secret.

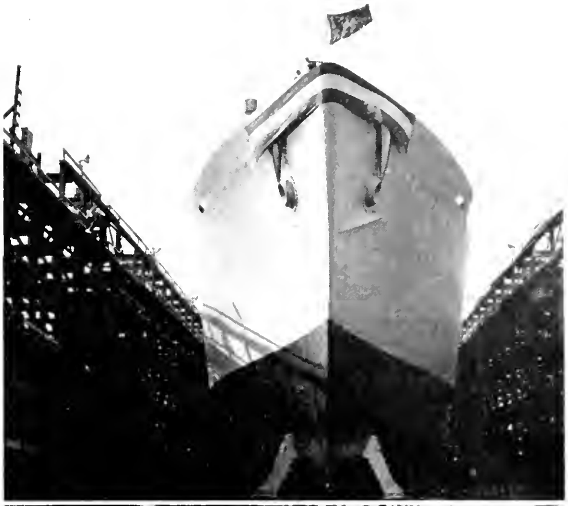
Troopship Honors Air Force General

As a tribute to an Air Force hero in World War I, the U.S.S. General M. M. Patrick, a troopship, was launched on June 21 at Shipyard No. 3, Kaiser Co., Inc., Richmond, Calif.

Major-General William E. Lynd, Commanding Officer 4th Army Air Force, San Francisco, in the principal ceremonial address, commended achievements of General Patrick in developing the air force in World War I. General Lynd was for some years associated with General Patrick.

Participating in the launching ceremony were Mrs. William E. Lynd, as sponsor; as matron of honor, Mrs. Emil C. Kiel, wife of Brigadier-General Kiel, Commanding General 3, Eighteenth Wing, Glendale; and as flower bearer, Miss Barbara Hodson, clerk in the shipyard, who was recently named "Queen of the Welders" in a shipyard contest.

FIRST VICTORY TRANSPORT



Down the Calship ways at 5 p.m. on June 13 the Victory transport U.S.S. Haskell, first of her type to be launched by any of the five yards assigned to Victory transport construction, sped into Cerritos Channel. The 455-foot vessel is the 359th ship to be launched by the California Shipbuildiing Corporation at Terminal Island, Calif.

●

With the traditional champagne, Mrs. W. L. Friedell, wife of Rear Admiral Friedell, Commandant, 11th Naval District, christens the ship. At left, arms laden with red roses, stands the matron of honor, Mrs. Schuyler F. Heim, wife of Captain Heim, Commandant, Naval Operating Base, Terminal Island.

●

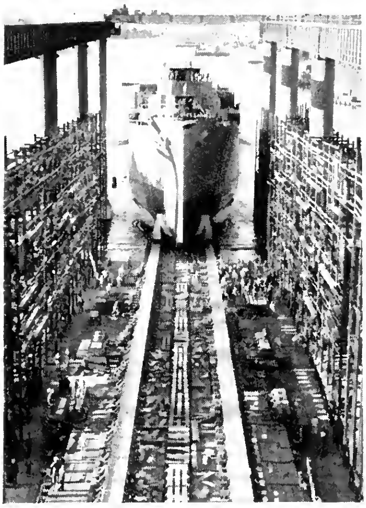
On the launching platform just before the transport went down the ways. Left to right are Rear Admiral Friedell; Commander Anton L. Mare, who will command the transport; and John A. McCone, president of California Shipbuilding Corporation.

Rear Admiral Friedell and Mr. McCone look on attentively as a woman burner prepares to make the first of six cuts that let the Haskell slide down the ways.

Todd-Managed Yard Launches 8600-Ton Seaplane Tender

The U.S.S. Salisbury Sound, 8600-ton Navy seaplane tender, was launched on June 18 at the plant of the Los Angeles Shipbuilding & Dry Dock Corporation, a San Pedro, Calif., shipyard managed and operated by the Todd Shipyards Corporation for the U. S. Navy.

Mrs. John Dale Price, whose husband is a rear admiral on duty with Naval Air Forces in the South Pacific, sponsored the vessel, with Mrs. John Burke Voit of San Pedro as matron of honor.



The U. S. S. Salisbury Sound slides down the ways at the Los Angeles Shipbuilding and Drydock Corporation.

Below: The launching party. Left to right are: Capt. Albert N. Norris, Supervisor of Shipbuilding, 11th Naval District; Mrs. F. D. Hesley; Mrs. John Dale Price, wife of Rear Admiral Price, sponsor; Mrs. Jean Burke Voit, matron of honor; and F. D. Hesley, general manager for Todd Shipyards Corp.

Originally designated the Puget Sound, the Salisbury Sound now bears the name of an important sound in Southern Alaska. Two sister ships, the U.S.S. Pine Island and the U.S.S. Norton Sound, were previously launched at the same yard.

Triple Launching Celebrates 5th "E" Award

At 11:30 a.m. on May 31, at the Terminal Island plant of the Harbor Boat Building Co., a unique ceremony was held. It was the launching of three U. S. Navy fighting ships simultaneously. This was the first time on the West Coast that three fighting ships have been sent to the water on one occasion. It also marked a new first for the Harbor Boat Building Company. Among the other firsts for this company were: the first launching of a YMS type mine sweeper on the West Coast, the first double launching of PT boats on the West Coast and the first launching of British PT boats under Lend-Lease.

The triple launching took place on the occasion of the presentation of the fifth "E" award to the company. The presentation of the Army-Navy "E" flag with the four added stars was made by Captain D. L. Erwin, and was received for the company and workers by the three sponsors, Mrs. Mary E. Dossi, Mrs. Frances Palmateer and Mrs. Jessie Ehle. Mrs. Palmateer responded for the employees of the yard, saying that they were very proud and happy to receive this high honor, and that the men and women in this plant will do all in their power to maintain and exceed the past production of much-needed fighting materials so that the war over there could be prosecuted with the least loss of time.

Christening one of the three Navy Aircraft Rescue Boats, which hit the sea simultaneously. The boats were built by Harbor Boat Building Co., Terminal Island, San Pedro.

Civil War Financier Honored

The memory of a man whose name was prominently identified with the financing of the Civil War was honored when, on June 9, the Liberty ship S. S. Jay Cooke was launched at Shipyard No. 2 of the Permanente Metals Corporation at Richmond. She was the 561st ship launched at Richmond.

The traditional champagne bottle was smashed against the ship by the sponsor, Mrs. W. C. Peet, Jr., wife of Lieut. Comdr. Peet, Pacific director of the War Shipping Administration, who had as her matron of honor a friend, Mrs. Peter DeLancey Lewis. Mrs. Barbara Christopherson, an employee of shipyard No. 2, was flower bearer. The invocation was delivered by Rev. Karl Markgraf, pastor of Trinity Episcopal church in Oakland.

Jay Cooke, for whom the ship was named, was a New York banker who sold $2,000,000,000 of bonds for the Federal Government during the war between the states. He was credited by Abraham Lincoln as one of the chief factors in the victory of the Union over the Confederate States.

Steel Baby Tuna Clipper on Ways

The first steel tuna clipper to be built in San Diego for years is now in frame and plating, and is being started at the Crofton Diesel Engine Company plant. This is a "V" bottom design utilizing straight line sections at all stations, and completely avoids furnacing of any plating. The length overall is 54 feet, beam 18 feet and molded depth 9 feet. The displacement light is calculated at 50 tons, and the vessel is expected to carry a maximum load of 50 tons of fish, all in brine. The hull is divided into 14 watertight compartments with all fuel tanks built integrally with the hull. The compartments consist of 3 tanks in the bow, engine room, 6 brine tanks in the hold and 4 tanks in the stern.

The power will be two 125-hp General Motors diesel engines driving twin screws each through 4.4 to 1 reduction gears to give the vessel a sea speed of eight miles. The engines will be 6-cylinder 2-cycle with superchargers.

All hull construction is electric welded, with all compartments water- and oiltight.

MARINSHIP LAUNCHING

Representing the 1300 members of Marinship's Power Machinery Division, Mrs. Carl H. Nilsson sends the 16,500-ton tanker S. S. Mission Santa Barbara down the ways at the Sausalito yard on June 8. The launching of this ship, named for the "Queen of the Missions," was dedicated to the workers who install the 10,000-horsepower propulsion equipment in all Marinship tankers. Shown are Ralph Hyet, machinery supervisor, at the microphone; Mrs. Kenneth Sutherland (matron of honor); Carl H. Nilsson, general superintendent of power machinery; Father Augustine Habrecht of Santa Barbara, vice provincial of the Order of Franciscan Monks; Mrs. Nilsson (sponsor); and Joel Nilsson. *(Photo Courtesy Marinship)*

Oregon Shipbuilder's Contract

Rear Admiral Howard L. Vickery, vice chairman of the U. S. Maritime Commission, virtually assured jobs for at least 12 months for all workers now employed in the U. S. Commission shipyards in the Portland area.

The Albina Engine and Machine Works has been added to the Commission's units and has been awarded a contract to build four steel 4000-ton coaster vessels, according to Rear Admiral Vickery.

The addition of Albina makes four Maritime Commission yards in the Portland area. The other three are Kaiser, Vancouver; Oregon Shipbuilding; and Kaiser, Swan Island.

40TH T-2 TANKER

Marinship's 40th T-2 tanker goes down the ways as the official launching party watches from the platform just after Mrs. Fred W. Boole (left center) had broken the champagne on S. S. Mission Buenaventura. Taking part in the recent launching, dedicated to Marinship's administrative workers, were S. H. Barrett, assistant to the administrative manager; K. K. Bechtel, yard president; Mrs. K. K. Bechtel; Charles Carruthers; Mrs. Boole (sponsor); Mrs. Carruthers (matron of honor); Robert Digges, administrative manager; Fred W. Boole, administative services manager; and Dr. Lynn Townsend White. *(Photo Courtesy Marinship)*

Visit to Pacific Fleet

Rear Admiral Howard L. Vickery, vice chairman of the United States Maritime Commission, who left here for Washington, July 5, after spending two weeks visiting Pacific Coast shipyards with Carl W. Flesher, regional director, stated that the shipyards of the Nation built 719 ships with a combined tonnage of 7,247,557 for the first five months of 1944, with 155 vessels of 1,537,915 constructed in May.

Merchant ship construction during the same period in 1943 amounted to 712 vessels of 7,143,548 tons.

THE ELECTRIC STRAIN GAGE

(Continued from page 97)

of which was proportional to the applied weight. The diagram shows a combination of several crystals with electrodes across their X-axis rigidly connected to the fixed and movable points of the strain gage. The pressure of the strain gage will produce a current between the electrodes across the resistance, which will be magnified by the shown Pentode. Professor Langerin as early as 1917 found that piezo-electric quartz plates could be used for detecting submarines. This apparatus has been used extensively as a sonic depth finder. In this a pulse is generated which is recorded directly on a moving record and is also sent out into the ocean. It strikes the bottom and is reflected back, causing another mark to appear on the record. Knowing the difference in time and the velocity of sound in sea water, the distance to the bottom can be measured. Fig. 7 shows one stage of tuned radio-frequency amplification with an air-core transformer as a coupling element to another penthode or triode, the output of which is indicated on an oscillograph.

Figure 8 represents a direct coupled amplifier in which the grid of the tube receiving the input voltage is directly connected to the plate of the amplifier tube. Such an arrangement is capable of amplifying direct as well as alternating voltages. The various stages of the amplifier are connected across a single voltage divider. Separate sources of filament current are required for each tube. This system is used for dynamic tests only on account of current leakage. The writer thinks, however, that in view of the high mechanical and electrical properties of some crystals, crystals could be adapted for slow dynamic tests.

Conclusions

In the foregoing the writer has tried to show the importance of measuring tests from the start, in the prefabrication stage of a ship, in view of the new methods used in the construction. The measurement of the highest stresses, combined with the determination of the endurance limit of the material, would help to determine the dynamic safety factor more accurately. The mutual influence between measurement and calculation will result in a more accurate determination of certain arbitrary assumptions based on old practices and experiences.

A clear picture of distributed stresses as a result of manifold static and dynamic tests or a combination of same may lead to a revision of preliminary assumptions of the design.

Magnetic and electrical tests of the steel alloys used by steel mills and some shipyards and the recently developed supersonic methods give a good picture of the isotropic properties of the material itself.

Pure dynamic tests of ships are not possible on account of the presence of gravity, but in ship construction the builder or designer cannot rely upon static tests alone. Use of strain gage measurements at working conditions shows the stresses in the structural formation which were too complex to permit ready calculations.

Of the several kinds of strain gages described, the wire resistance type is the simplest, but it is not accurate. The bridge method is particularly applicable to most gaging methods.

For static or slowly varying strains an indicating instrument that is calibrated directly in either stress or strain is employed, and 60-cycle power supply can be used. For dynamic tests high frequency is used. An oscillograph is used for dynamic tests. Of course, the handling of any recording instrument requires skill on the part of the operator.

A number of strain gages, installed at different parts of the ship in motion, will give a picture of stresses on the ship.

The meters in connection with the gages may be calibrated to read directly the additional loads or volumes in gallons of liquids contained in tanks.

Electric strain gages are also being used for measuring vibrations on ships. High speed engines are now being installed on ships. Such an engine has a high natural frequency which is liable to exceed the natural frequency of the base and be the cause of dangerous vibrations on the ship. The natural frequency of the base of the engine should not be lower than that of the engine. Knowing the exact modulus of elasticity of the steel plate, which is guaranteed by the steel manufacturer, the natural frequency of the plate is easily determined.

In this paper the writer gives the principles of use of strain gages. He is in possession of detailed drawings of electric strain gages and of instructions for their use and required computations.

Small Plants Help Build Big Ships

Hundreds of small manufacturing plants, many of them located in inland states, are making a heavy and vital contribution to the great merchant shipbuilding program, points out Shipbuilders Council of America.

During 1943 more than half of all contracts over $10,000 awarded by the U. S. Maritime Commission's Procurement Division went to plants hiring less than 500 employees. Small plants received 2452 of the 4881 construction material contracts let during the year.

Of 6990 subcontracts let by shipyards on Maritime construction, 4733 (67.7 per cent) were handled by small business firms.

Among the items manufactured by small concerns are: boiler casings, jigs and fixtures, castings, steel wrenches, forgings, propulsion shafting, pillow cases and sheets, king posts and masts, machine tools, bedplates, life rafts, life preservers, drums for boilers, main condensers, packings for diesel engines, searchlights and floodlights, coolers, insulation for ships' stores, engines, water condenser castings, metal lifeboats, steering engines, air injectors, heat exchanger equipment, valves, etc.

Running LIGHTS

Who When Where

Edited by B. H. Boynton

"WAVES" Have New Admiral

Although the Navy Department never contemplated it, the "Waves" have an Admiral on duty near the San Francisco waterfront.

Eugene V. Winter, marine engineer and distributor of marine supplies, explains that the War Dog Fund or "Dogs for Defense, Inc.," of 245 Park Avenue, New York, has devised a graduated scale of ranks for the dogs of persons contributing to the support of the organization. The ranks range from private in the Army (or seaman in the Navy) at a cost of one dollar to the status of full General in the Army or Admiral in the Navy for an entry fee of $100.

Mr. Winter sent the war dog fund a check for $100 to obtain the rank of "Admiral" for his ten-year-old female Scottish terrier, "Bonnie." Mrs. Winter, who admits to being as uniform conscious as the next person since the outbreak of war, obtained navy blue material, gold braid and gold stars, and designed a natty uniform for "Bonnie" with the four stars of a full Admiral on each shoulder.

Mr. Winter explained that the rank of Admiral is the only one suitable for "Bonnie" because "she's grizzled and gray, pot-bellied and tough as hell!"

Seamen's School Opened

Necessity to relieve the critical shortage of trained hands for merchant ships operating from the Puget Sound area to the war zones has prompted the United States Maritime Service to open an able bodied seamen upgrading school at the Coast Guard base on Lake Washington, Seattle.

The school has been in operation for several months, according to L. C. Chadwick, instructor of training classes for the Maritime Service in Seattle, but is now to operate with increased facilities in an effort to provide more men with the necessary training. To date 120 men have completed the course.

On a recent trip to Seattle, John E. Ross, representing the San Francisco regional recruiting office of the W. S. A., pointed out that only half the needed number of men have been available.

Around the Ports

Los Angeles Propeller's New Officers

The Propeller Club of the United States, Port of Los Angeles-Long Beach No. 66, on June 21 heard an interesting address on the post-war outlook for foreign trade and shipping, by Graydon Hoffman, president of the Long Beach Chamber of Commerce and vice president of the Bank of America. At this meeting, the following officers and governors were elected, the officers for a period of one year, expiring in 1945 and the Board of Governors for a period of three years, expiring in 1947:

President, Lee K. Germille of Overton, Lyman & Plumb; First Vice President, H. E. Pickering of W. H. Wickersham & Co.; Second Vice President, L. E. Archer of Moore, McCormick Lines; Third Vice President, Leonard T. Backus of Fireman's Fund Insurance Co.; Secretary Treasurer, Howard W. Woodruff of William Diamond & Co.

Board of Governors: Lee K. Germille, new president; Rear Admiral I. C. Johnson, U. S. Navy (Retired); F. A. Hooper, American Hawaiian Steamship Co.; Wm. A. St. Amant, Grace Line; E. A. MacMahon, Luckenbach Steamship Co.; Harold R. Pauley, The Petrol Company.

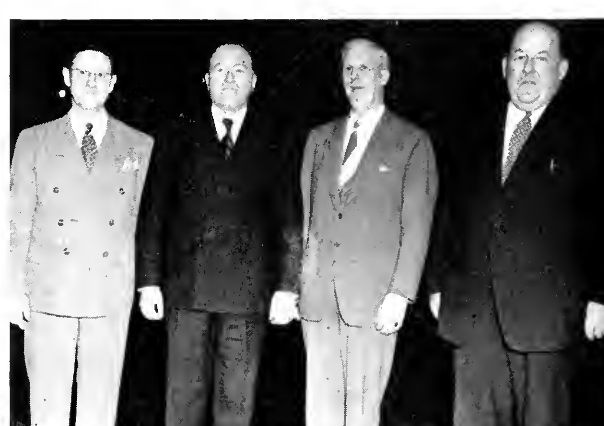
Members of the Board of Governors whose term of office will expire in 1945 are: Leonard T. Backus, Fireman's Fund Insurance Co.; Jas. G. Craig, Craig Shipbuilding Co.; Dan Dobler, The Texas Co.; Arthur Eldridge, general manager, L. A. Harbor Department; P. S. Newcomb, Barber Steamship Lines; and Edgar Wilson, American President Lines.

Governors whose term of office will expire in 1947 are Eloi J. Amar, port manager, Long Beach Harbor Department; Harold Black of McCutchen, Thomas, Mathew, Griffiths & Greene; R. J. Chandler, Matson Navigation Co.; H. E. Pickering, W. H. Wickersham & Co.; and W. Kenneth Pope, of Pope & Talbot, Inc.

This was the last meeting of 1943-44, to be followed by the Propeller Club's usual vacation during July and August, according to Hugh Middleton, of De La Rama S. S. Co., to whom Pacific Marine Review is indebted for this up-to-the minute list of new officers and governors. No new committees were named at this meeting.

Upper left: Arthur M. Tode presenting Charter of Propeller Club No. 91 to Elston A. Lotz, president of the new Port of Brunswick, Georgia, on April 27.

Right: Duplicate winners of Essay Contest at New Orleans held on National Maritime Day were Robert E. Leake, Jr., and Bruce A. Wedemeyer receiving $50 war bonds from Rear Admiral Howard L. Vickery.



Lower right (left to right): John G. Thompson, secretary - treasurer; John F. Gehan, president; O. B. Whitaker, retiring president; and Lewis D. Parmelee, vice president of the Port of New York.

San Francisco Propeller's June Session

On Wednesday noon, June 21, the ?ropeller Club of the United States, ?ort of San Francisco, met at the St. ?rancis Hotel for its regular monthly uncheon and program under the hairmanship of President Fred L. Doelker.

Gene Hoffman, secretary-treasurer, eported several new members and ntroduced several old members re-ently returned. Notably "Eddie" Harms of the McCormick S. S. Co. nd Joseph F. Marias, former chair-man of the California State Harbor Commission at San Francisco.

During the program two speakers vere presented. First, Commander Bennett M. Dodson, Pacific Coast District Supervisor, Maritime Service Cadet Training Program, who spoke n the training program presently arried on by the Maritime Service n various schools all over the Na-ion. The 18-month basic course for adets is turning out hundreds of oung men who are mentally and hysically trained to start careers as fficers in the American Merchant Marine. Every encouragement is iven these men to rise in their hosen profession. The Commander's alk strongly emphasized the dignity nd standing of merchant marine offi-ers and the obligation of ship opera-ors to treat these men as professional xperts.

The second speaker was Comman-er H. L. ("Hank") Miller, U.S.N., vho gave the audience a very vivid nd graphic picture of the aerial war n the Pacific. He participated in the 'Shangri-la"-Tokio raid and in prac-ically every major raid in the Cen-ral and Southwest Pacific.

Both of these talks drew prolonged pplause from the large and enthu-iastic group of members and guests.

Top: Guests at the head table include Ensign John Mann, Ensign Young from Washington, D. C., and Lieutenant Commander E. G. McDonald of the Cadet Training School; Fred L. Doelker, Commander Bennett M. Dodson and Commander R. M. Sheof.

Commander H. L. "Hank" Miller, USN, relating experiences of aeriol warfare in the Pacific.

Commander Bennett M. Dodsan, Pacific Coast district supervisor of the Maritime Service Cadet Training Program explaining to the Propeller's the extensive training course offered all over the nation.

NAVAL AFFAIRS COMMITTEE VISIT TO TREASURE ISLAND

First row (L to R): John J. Mulvany, Bank of America, Alameda; Chalmers Graham, Admiralty attorney; Captain Robert W. Cary, U. S. Naval Training and Distribution Center, Treasure Island; Luther E. Gibson, chairman, Vallejo Chamber of Commerce; E. J. McClanahan, Standard Oil Co.; Captain Roark Montgomery, (SC) USN, Aviation Supply Annex, Naval Supply Depot, Oakland; Marshall Dill, importer-exporter; Commander R. E. Hess, USN, Alameda Naval Air Center.

Middle row: Herbert Bowerman, San Mateo committee rep.; C. Ferry Hatch, Vallejo rep.; Comdr. Grover A. Miller, USNR, Treasure Island; Comdr. G. N. Lantz, USNR, Supply Corps, Treasure Island; Captain N. L. Rawlings, USN, Hunters Point Naval Drydocks; Guy R. Kennedy, Vallejo rep.; Captain C. K. Youngskin, USN, Medical Corps., Treasure Island.

Standing: Lt. (jg) Wm. K. Atkinson, USNR, Hunters Point Naval Drydocks; E. H. Hammond, Oakland Chamber of Commerce; Lt. Edward Bransten, Jr. (SC) USNR, Naval Supply Depot; Lt. W. A. Martin, USNR, Treasure Island; Comdr. L. R. Gray, USN, Treasure Island; Lt. Comdr. W. W. Agnew, USN, Alameda Naval Air Center; Frank O. Bell, Vallejo C. of C.; Richard D. Brigham, Anglo California Nat'l Bank; Lt. Comdr. James Bassett, Jr., USNR, 12th Naval District public relations officer; Lt. John J. Wiley, DV (S) USNR, Naval Supply Depot, public relations officer; Comdr. W. L. Knickerbocker, (SC) USN, Officer-in-Charge, Advance Base Section, Naval Supply Depot; L. C. Reynolds, Pan American World Airways; Ames Brown, Pan American World Airways; Warren Burke, United Air Lines; Victor A. Kropt, Pan American; Jack McLaverty, Jr., Alameda C. of C.; A. J. Dickie, editor, Pacific Marine Review; Wm. L. Montgomery, San Francisco Chamber of Commerce; Lt. G. R. Hodges, (SC) USNR, Naval Supply Depot; and Lt. Comdr. Raymond S. Kimbell, DV (S) USNR, Treasure Island.

Voyage No. 15
S.S. Bilge Club

All time highs for attendance and enthusiasm were reached at the 15th Annual Barbecue, Sports Carnival and Golf Tournament, of The Bilge Club of Los Angeles Harbor on June 24, at the Palos Verdes Golf Club.

With T. W. Buchholz, Master S.S. "Bilge", at the helm, this unique and active maritime industry organization staged what the "mighty crew" enthusiastically termed the best outing in the Club's history.

Over 100 members and guests took part in the Golf Tournament and much credit is due to Ed Hannay, Sr. for handling the event with capable handicapping.

Another big event of the day was the basketball game under direction of Ed Whittemore — "Black Gang" vs. "Deck Department." Twenty-two to 19 was the score, with the Deck boys in the "win" column. Skipper Buchholz was the fearless umpire. He did a good job. The "stands" were crowded, the fans working up a whale of an appetite for the great barbecue.

E. L. Archibald managed the Tug-of-War which brought forth some of the mightiest athletes in the Club, added strength and weight to this event was the last minute entry of jovial and popular Captain Theo. Peters, marine superintendent of Standard Oil Company's L. A. Harbor marine department, and one of the founders of the widely known Bilge Club.

Long awaited and supreme event of the big day was the BARBECUE at twilight in the grove, with its colorful house-flag decorations. Walter Richards, Sr. was "Chief Steward" who was ably assisted by a cuisine corps comprising Joe Costello (Abalone Steak Specialist), Capt. Ed Ryan, Sam Clappell, Johnny Gaspar, Baron Young, Walter Richards, Jack Beatty, and Dan Dobler.

Golf prizes were awarded to Ray Mitchell, Jr., Carl Martin, Backus, George Missall, "Red" Eaton, Ray Mitchell, Sr., Reeves, Capt. P. Hanson, Iver Bell, Al Johnson, Jorgensen, Lt. Sommers, Geo. Stevenson, Jim Sanders, Lockhart, Freeman, Smithers, Walter Woods, R. H. Williams and Capt. Peters.

Committee Chairmen

Billy Wickersham, Honorary General Chairman.

T. W. Buchholz, General Chairman.

R. W. Decker, Ass't General Chairman.

Walter Richards, Sr., Chairman—Barbecue.

R. W. Decker—Entertainment.

E. W. Hannay, Sr.—Golf Handicap.

A. F. Boro—Prizes.

Wm. Harrington—Attendance.

Howard Hartry—Reception.

W. Whittemore—Baseball.

E. L. Archibald—Tug-of-War.

Jim Craig—Rules.

Carl Morabito—Grounds.

Winn Rash—Finances.

Floyd Nelson—Publicity.

Bob Snodgrass—Secretarial.

PMR attends the Bilge Club Outing

…elson, Texas Co.; Win Rash, California Bank; Bob Snodgrass, …ery, Bilge Club; and Ed Kellenberger, Case Construction Co.

Calling them when he sees them! Umpire T. W. Buchholz, President, Bilge Club; with Metropolitan Stevedoring Co. Pitching, Howard Hartry, Customs House Broker.

Nearly snapped the line! Powerful Capt. Theo. Peters and well trained mates caused the crowd to gasp.





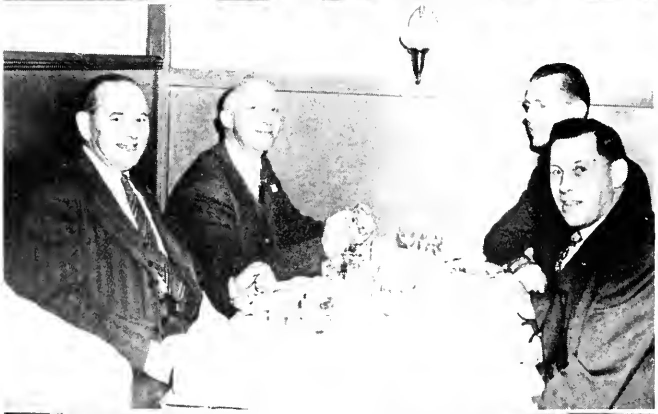



Maritimers from Wilmington, 'Pedro, L. A. and Long Beac
Harbors at Palos Verdes on June 24th

FAMILIAR FACES

The group here include Captain Fred M. Earle, Colonel J. K. Herbert, the PMR boys, Joe Hare, G. A. Reeves, Jim Buntin, Joe Barry, Ed Hough, Herbert Pickering, Doc Seymour, John Eidom, and R. J. Moore.

The Mariners



Mariners, find yourselves! Here is where you were on the night of June 20 — the place, San Francisco's Del Mar Club where you held the 15th Annual Frolic.

Relax at Frolic

15th Annual Banquet

Father and son in rapt attention while John Reber (in photo below) spoke on the San Francisco Bay Project—The Reber Plan at the May meeting of the Mariners Club. Left: David John Robertson of Kaiser Co's. Richmond No. 3 yard and M. David Robertson of Hough & Egbert.

(Above and below)

264 Mariners and their guests made the 15th Annual voyage, President Frank De Pue received grand help from committeemen Dick Glissman, Bern De Rochie, Ned Gundersan and Felix Billig.

Left: Officers and guests of the W.O.A. M.M., Inc. pose for PMR's camera at the June meeting.

Below: Mrs. Earl H. Carder, and Captain Krantz, proudly admiring the club's new flag, a gift from Western Pipe and Steel Co.

Propellers Guests of The Women's Organization

The newly organized Women's Organization for the American Merchant Marine, Inc., Port of San Francisco, held its June meeting at the Army Navy Club in San Francisco. In lieu of the installation of officers, the club had as guests members of the Propeller Club of the United States, Port of San Francisco.

Fred Doelker, president of the Propeller Club's Port of San Francisco, presented to Mrs. Earle H. Carder, newly elected president, a gavel, a gift from the Propeller's. Other representatives present were Eugene Hoffman, secretary-treasurer and Captain Henry Blackstone. These men greeted the ladies with words of encouragement on their work, which consists of educational programs to enlighten the American public, through its youth, to the necessity of maintaining an adequate American merchant marine.

During the course of the meeting F. A. Corbusier of Western Pipe and Steel donated to the club a beautiful American flag, a gift from his company.

Another guest speaker, Captain Y. Krantz of Alcoa Steamship Company, spoke on the "Adopt a Ship" plan, the first educational program of the club of which Mrs. E. N. Babb is chairman. Captain Krantz's ship and crew has been "adopted" by a midwestern school under the sponsorship of the New York City Women's Organization's "Adopt a Ship" committee headed by Mrs. Arthur M. Tode.

Another high light of the day was the reading of congratulatory letters from Admiral Emory S. Land, chairman of the U. S. Maritime Commission and Arthur M. Tode, honorary president of the Propeller Club of the United States.

The recently elected officers of the Women's Organization are as follows:

Mrs. Earle H. Carder, president; Mrs. Paul Cronk, first vice president; Mrs. Allan Toole, second vice president; Mrs. Carl W. Flesher, treasurer; Mrs. David Neilson, corresponding secretary; Mrs. Franklin B Long, recording secretary; and Mrs B. Hamilton Moore, historian.

The Board of Directors are: Mrs. D. J. Lillevand, Mrs. Frazier Bailey, Mrs. Hugh Gallagher, Mrs. Charles Wheeler, Mrs. Harry Parsons, Mrs. Clyde Williamson, Mrs. James S. Hines, Mrs. J. A. McKeown, Mrs David Porter.

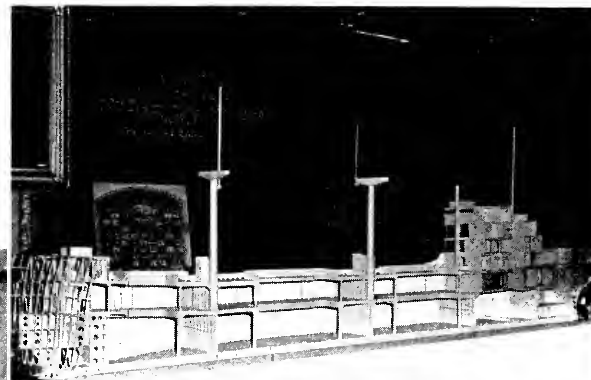
(Please turn to page 139)

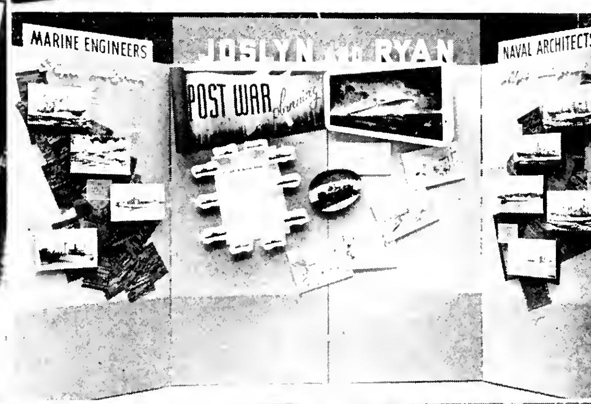
JOVIAL SCENE AT RECENT LAUNCHING

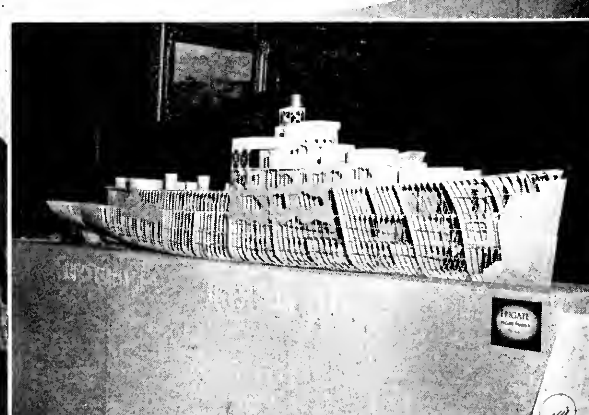
J. F. Barrett (at left) of Barrett & Hilp's Belair Shipyard of South San Francisco, with James S. Hines and Mrs. Carl W. Flesher, wife of regional director of the U. S. Maritime Commission, caught here at recent concrete barge launching.

Marine Exchange Shipbuilding Exhibit

OPENED ON MARITIME DAY AND WAS DISPLAYED ON THE EXCHANGE FLOOR







Marine Exchange News of the Month

By M. A. Cremer, Manager

During the month there have been admitted to membership in the Marine Exchange the following:

Paul Steffen
Capt. H. W. Wiemers
Plant Rubber & Asbestos Company
Neil H. Peterson Company
Captain F. Hawkesworth

Exhibits on the Exchange Floor

An exhibit on the Exchange Floor includes a chart over one hundred years old, a collection of ships' bells and a display depicting the Central Valley Project.

The chart, published in 1826, was used by the master of a sailing vessel traveling the Atlantic in those days. A number of courses are plotted north and south as well as east and west. The direction of the courses taken are most interesting.

The chart was discovered recently in Salem, Massachusetts, and has been presented to the Exchange by Captain Thomas White of the Weyerhaeuser Steamship Company.

The bells displayed were collected over a period of 15 to 20 years by Alfred W. Young of the War Shipping Administration. They are from vessels that proved to be total losses, including the steam schooners Hartwood, Daisy Putnam and Phyllis, which were wrecked along the coast.

The display of the Central Valley Project gives some of the little-known facts regarding a major undertaking, which to most of us is symbolized by the Shasta Dam.

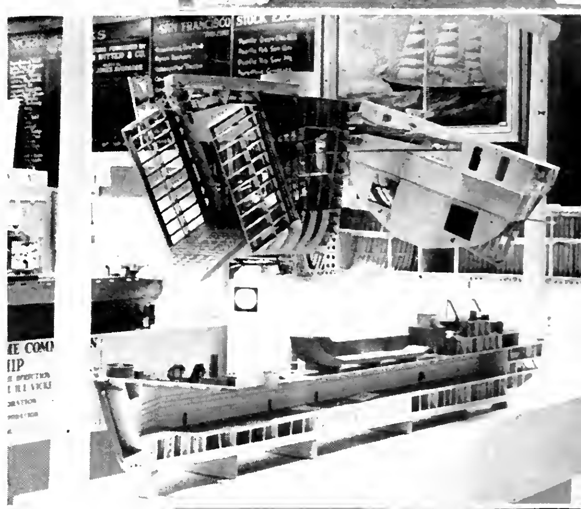
The Central Valley Project is not only a large water control project affesting the very heart of the State of California; it is the San Francisco Bay Area's greatest post-war project insofar as future work is concerned, and it is, furthermore, the Federal Government's largest reclamation project.

Some of the high lights regarding the project that should be better known are:

The rich State of California has been gradually losing its farmlands—in the delta to salinity and in the San Joaquin Valley to absence of water. It is astounding to learn that here in California some 200,000 acres of farm land are becoming a desert.

One of the means to be used to provide water in the southern part of the San Joaquin Valley is the building of a river 70 feet wide at the top for a distance of 160 miles from the Friant Dam to Bakersfield.

A whole new vacationland will be provided by the great 35-mile-long mountain lake in the Shasta National Forest.



Junior Chamber of Commerce "spark plugs" who worked for the success of he Marine Exhibit appear at left center view, opposite page. Front seated: Herbert Brawn, chairman, National Maritime Day; Elmer Johnson, president San Francisco Jr. Chamber of Commerce; a charming lass; Gordon Hay, with General SS Co.; Alan Laidlaw, American President Lines. Back row: Anthony Sciarra, Moore-McCormick Lines; Murray Blanford, General S.S. Co.; Alberto Scott, Jr. W.S.A.; Frank Janov Marine Exchange; Vin Fallon, United Seamen's Service; and, Don Fazackerley, chairman, Marine Committee, San Francisco Junior Chamber of Commerce.

Other personalities on the opposite page include, Ed Hough presiding behind the valve equipment exhibit, and Carl W. Flesher in the foreground of the Maritime Day postage stamp display

And, of course, the rebirth of the Sacramento's former river traffic as far north as Red Bluff will mean a great deal to the development of the valley's industries—lumber and mining, as well as agriculture.

Members of the Marine Exchange are vitally interested in the project because of the greater solidity it gives to the port by the development on a large scale of its immediate hinterland.

Bay Area Maritime Committee

The Committee's last meeting, devoted to post-war planning and addressed by Col. Alexander R. Heron and Robert C. Elliott, drew the largest attendance on record. Evidence of the Committee's wide recongnition and prestige is the increasing pres-

(Please turn to page 107)

WHO'S WHO afloat and ashore

Herman Nichols

Tubbs Cordage Company Executive Returns

Since early in 1942, Herman D. Nichols, vice president of Tubbs Cordage Company, has been on duty in Washington, D. C., as Hard Fiber Consultant and Chief of the Agricultural Products Branch of the Conservation Division. For the past two years, he has been a leading factor in the magnificent nation-wide campaign that has been carried on by the country's cordage manufacturers for the conservation of hard fiber and rope.

Back again at his desk at 200 Bush Street, San Francisco, he will take over an important part in Tubbs Cordage Company post-war planning. His two years in Washington, closely attuned to the war effort in assuring ample cordage supplies for the armed forces and for the needs of vital industry, have aided the cordage industry in successfully passing this important crisis. However, according to Mr. Nichols, this does not mean that the campaign for rope conservation should be relaxed. While the climax has been successfully passed, drastic manpower shortages still make the production of rope one of America's acute industries. Everyone should do everything possible to conserve their present supply and replace only when necessary.

Governor Names Pilot Commissioners

Shipping men are acclaiming Governor Earl Warren's recent appointments of Bradford Melvin, attorney; Captain Alfred T. Hunter, operating manager, General Steamship Company, and Captain Andrew G. Townsend, marine manager, Matson Navigation Company, as members of the California State Pilot Commission.

Mr. Melvin, a member of the law firm of Gregory, Hunt, Melvin & Faulkner, has been active in shipping and kindred industries since resigning his commission in the U. S. Navy following the last war.

Captain Townsend and Captain Hunter are widely known in the shipping business on both coasts, especially in the Pacific circles.

Captain Hunter is a master mariner, pilot and company executive, who began his career of sailing as a lad of 14. As the son of Captain J. C. Hunter, noted shipmaster in the Pacific Coast and Alaskan waters for 40 years, it is only natural he should turn to the sea. Following the last war, in which he distinguished himself in convoy service, Captain Hunter returned to San Francisco to enter the service of General Steamship.

Captain Townsend, another sea captain's son, sailed as a youngster with his father. He entered the Matson service as third mate in 1919 and was appointed master of the S. S. Makena in 1922. Appointed port captain in 1936, Captain Townsend found himself a year later named assistant to the president. In 1940 he was named marine manager.

Recently appointed Pilot Commissioners for the State of California include, from top to bottom: Captain Andrew G. Townsend; Captain Alfred T. Hunter and Bradford Melvin, attorney.

Leroy E. Caverly

Caverly Engineering Company

The Caverly Engineering Company, naval architects, engineers and marine surveyors established by Leroy E. Caverly and Mabel T. Caverly in July, 1943, and formerly located in Alameda, has taken a suite of offices in the De Young Building at 690 Market Street, San Francisco.

Mr. Caverly has had long and varied experience as a naval architect, engineer and marine surveyor from the time he joined the Union Iron Works of San Francisco back in 1898. Later this firm became the Union Plant of the Bethlehem Steel Company, Inc.

During World War I he became associated with the Los Angeles Shipbuilding and Drydock Company as naval architect and chief engineer in charge of designing and constructing a new shipbuilding, drydocking and repair plant, as well as designing a large number of vessels built by that company.

In 1925 he became assistant to the president in charge of Engineering and Construction. A year later he was made vice president and general manager in charge of plant operations, also serving on the board of directors.

In 1929 Mr. Caverly resigned and engaged in private practice as consulting naval architect and marine engineer in San Francisco and Los Angeles Harbor.

In 1940 he joined the Pacific Bridge Company of San Francisco, making the original design drawings for the A. R. D. drydocks built by that company, and in 1941 he went with the Pacific Coast Engineering Company as naval architect on the design of Navy tugs and other craft.

The Caverly Engineering Company is serving the Bethlehem Steel Company, Pacific Bridge Company, Pollock-Stockton Shipbuilding Company, Matson Navigation Company and others in connection with both new construction and conversions and at present has a staff of thirty-three employees.

Meet John F. Gehan, president of American Export Lines, recently elected president of the Port of New York of the Propeller Club of the United States for 1944-1945.

Norris H. Schwenk, new president Busch-Sulzer.

Busch-Sulzer's New President

Norris H. Schwenk, former divisional vice president of the Baldwin Locomotive Company, arrived in St. Louis late in June to take the helm of Busch-Sulzer Company, upon the election by the Board of Directors of the diesel engine firm. This office of president was recently relinquished by Edward B. Pollister due to ill health.

The new president spent a few days with Mr. Pollister acquainting himself, as he puts it, "getting my feet on the ground," and he expressed his appreciation of the cooperation given him by the plant employees and looks forward to intimate acquaintance with the men of the Busch-Sulzer family.

KEEPS THEM SUPPLIED!

Whirlwind pace of the current shipbuilding program has developed the Expediter—modern version of the first world war era "efficiency man." Here is David J. La Rochie, resourceful young expediter of the Permanente's, Richmond corps, who keeps a few thousand fittings moving into the hulls.

W. E. Waste, new vice president of Marinship

Marinship's New Vice President

Election of William E. Waste as vice president of Marinship Corporation was announced by K. K. Bechtel, president of the important Sausalito shipyard. Mr. Waste has been, and will continue to serve as general manager and director.

He has been general manager at Marinship since the shipyard began in March, 1942, in response to an emergency request of Read Admiral Howard L. Vickery, vice chairman of the United States Maritime Commission. Under his direction a $17,000,000 plant was constructed, fifteen Liberty ships delivered in record-shattering time, tanker construction undertaken and twenty-eight of the 10,000 horsepower tankers were delivered into service, all in less than twenty-seven months.

It was stated that the election was a tribute to his accomplishment and ability as proven during the past critical period at Marinship.

Surveying Firm Extends Field of Operations

The firm of Hough & Egbert, marine surveyors and consulting engineers, wish to announce the extension of their Marine Survey business to the Port of Los Angeles with the establishment of an office in conjunction with W. H. Wickersham & Company, 111 West Seventh Street, San Pedro, California.

The W. H. Wickersham & Company also announce the opening of their San Francisco office in conjunction with Hough & Egbert at 311 California Street, San Francisco, as steamship owners' agents. The establishment of this office will not affect Wickersham's business with Custom House Brokers in San Francisco, as this business is entirely separate from their Custom House work.

We have all known E. S. Hough and his late partner Edward B. Egbert for many years and the firm of bert, for many years and the firm of W. H. Wickersham and Company is a very old friend of Pacific Marine Review.

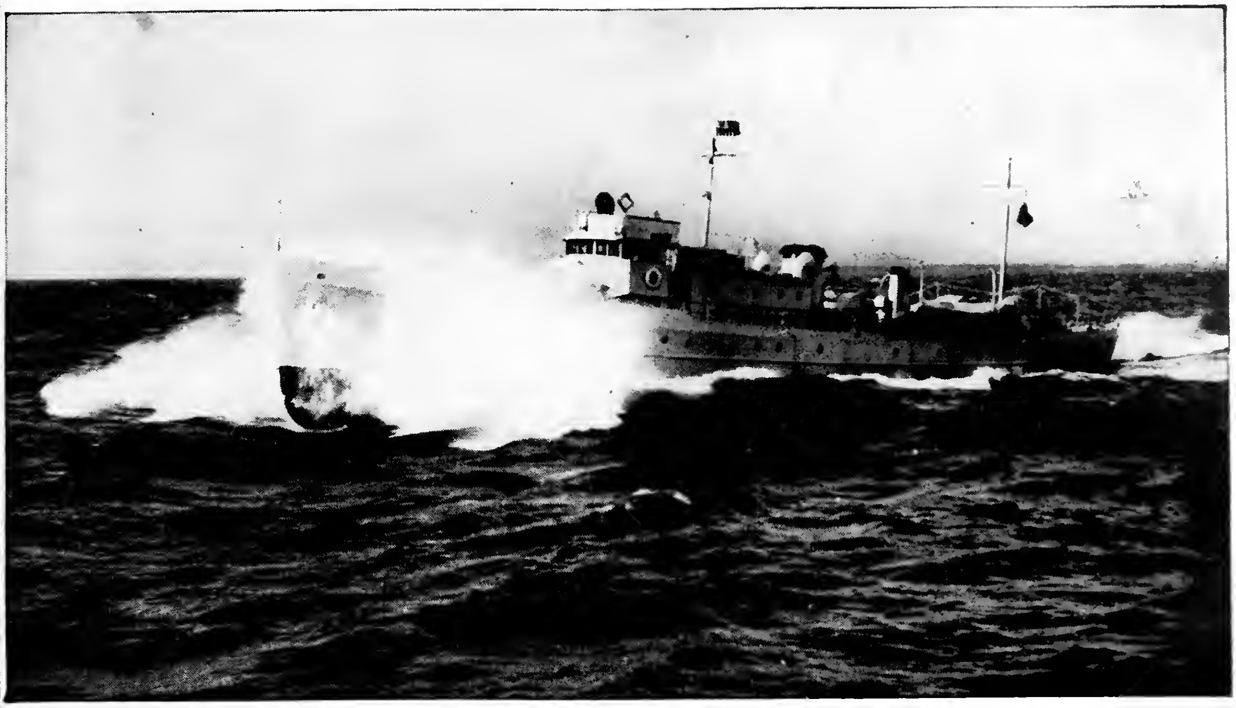
William Richards, vice president in charge of marine sales

Election of Officers at Dampney Company

New officers of the Dampney Company of America were elected recently at a Board of Directors' meeting following the death of William H. Laverack, president since 1931. The new officers of this company, manufacturers of Apexior protective coastings for metals, are as follows: Clarence J. Hunter, president and general manager; J. W. Laverack, vice president and treasurer; J. Dwight Bird, vice president in charge of railroad and Mid-West power sales; William Richards, vice president in charge of marine sales.

William Richards was in the United States Navy as an Engineer Officer from 1917 to 1919, chief engineer of ocean ships from 1919 to 1926, inspector of maintenance and repairs for the U. S. Shipping Board from 1926-1929, port engineer and marine superintendent for Lykes Brothers Steamship Company from 1929 to 1931. In 1931, he became marine manager for the Dampney Company. Mr. Richards brought with him a wealth of experience in this specialized field.

Frank De Pue, David Robertson and Ed Hough of the marine surveying firm who recently joined forces with W. H. Wickersham & Company.



The trial run that launched a new steering system

THE PHOTOGRAPH ABOVE was taken in 1932 during the trial runs of the Coast Guard Cutter THETIS.

The 165-foot THETIS was one of 18 such vessels equipped with the then new Sperry Electro-Mechanical Steering System. The 12-year record of the THETIS and her sister ships speaks for itself...

In peacetime, they served on general ocean patrol, Arctic and Alaskan patrol, and many special missions. When war came, these valiant little ships helped to form our first thin line of defense against the Nazi wolf-pack menace lurking along our shores, and gallantly held on until reinforcements were ready.

As a result of the performance of these equipments on the Coast Guard Cutters, the Navy chose the Sperry Electro-Mechanical Steering Systems for installation on 200 of the first Patrol Vessels which were authorized shortly before Pearl Harbor. Thus, when the emergency arose, this steering device also was tried and proved—ready to go to war. Since 1941, more than 2,000 installations have been made.

Normally, "finger-tip" electric steering is provided. If power should fail, a clutch in the steering stand permits the wheelsman to shift control immediately to manual steering. A rudder indicator shows rudder position in both hand and electrical steering. One or more non-follow-up steering controllers may be located at any place on the ship.

Electro-Mechanical Steering Systems are in use on many craft of the Navy, Coast Guard, Merchant Marine, and Army, and on privately operated tugs, ferryboats, and other craft.

The Sperry Electro-Mechanical Steering System is economical, rugged, and dependable. In the case of 32 installations where careful records were kept, maintenance costs for this equipment averaged only eight dollars per year.

Sperry Gyroscope Company
INC.

GREAT NECK, NEW YORK • DIVISION OF THE SPERRY CORPORATION

GYROSCOPICS • ELECTRONICS • AUTOMATIC COMPUTATION • SERVO-MECHANISMS

(Continued from page 108-A)

ence at its meetings of supervisors, county officers and top-notch businessmen of the 11 counties represented.

Colonel Heron, head of the State Reconstruction and Re-employment Commission, pointed out that a substantial part of the State's surplus income is being put aside to provide prepared plans for needed improvements. He emphasized the fact that the State is profiting by the experience of the thirties, when the Federal and State Governments attempted unsuccessfully, even with practically unlimited funds at their disposal, to place a large number of unemployed at work quickly. Then there were no prepared plans, and consequently very few men were actually put to work. The result was the much maligned W.P.A., which employed men merely to sweep streets, rake leaves and perform other tasks which required no plans.

William B. Warren just returned from East on a business trip in connection with the Annual Surveyors Meeting at the Home Office in New York, where some 20 principal surveyors of the United States gathered.

Robert C. Elliott of the San Francisco News has become the West's outstanding editorial writer on planning for the future. He has traveled extensively on the Coast, and is perhaps the one best qualified to speak on what various sections of the West are doing in post-war planning. He stated that the Pacific Northwest was far ahead of the Bay Area in planning on a regional basis. He cited the absence in the Bay Area of a post-war master plan for airports, such as Los Angeles County already has. He drew attention to the lack of planning here, as well as for industries to provide an outlet for the aluminum of Riverbank and the steel of Geneva, if these two plants are to remain in production. He urged that Col. Heron establish an office in the Bay Area to stimulate and assist in developing needed planning by the communities of the Bay Area as a unit.

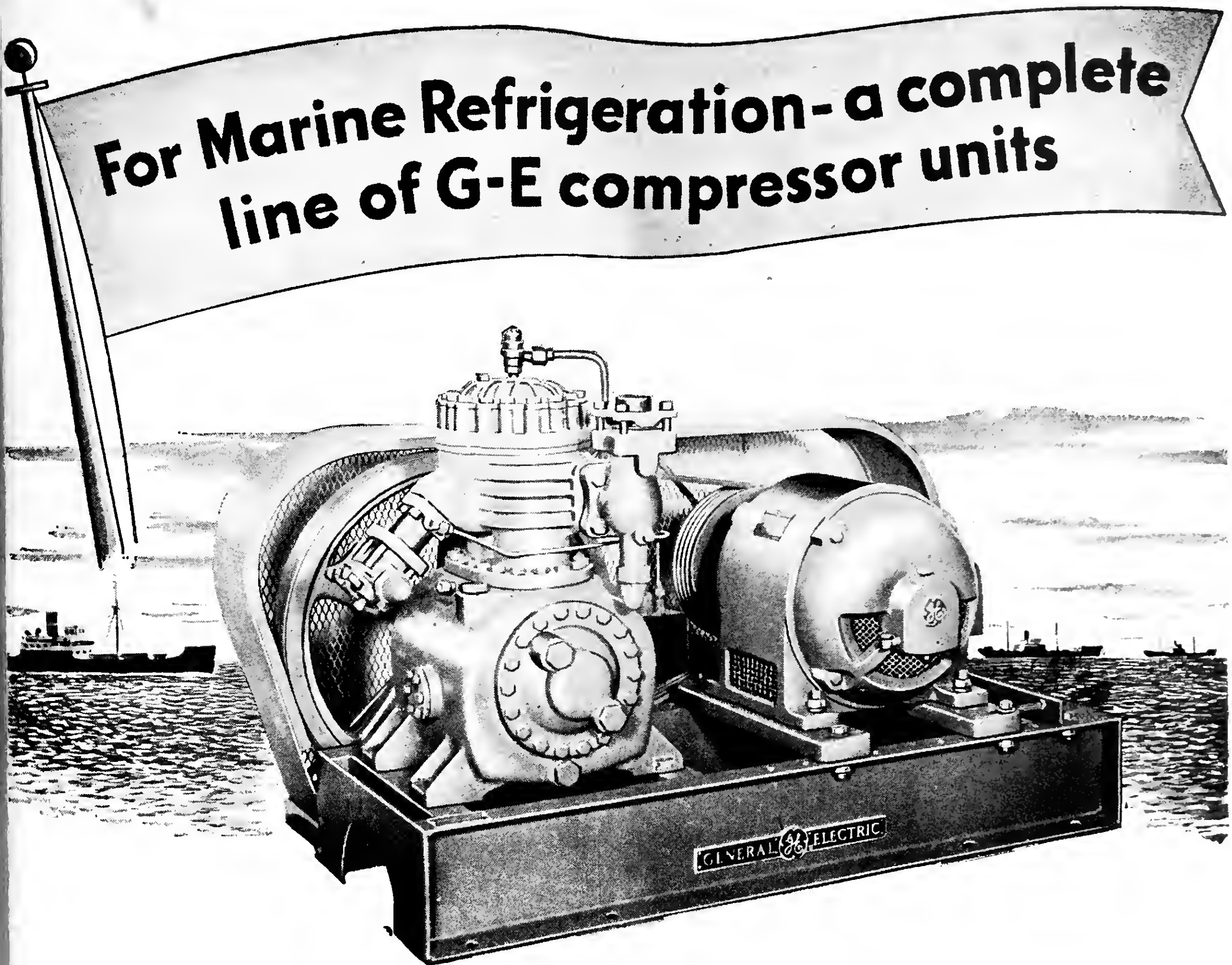
E. Harold Biddison, Colby Steel & Engineering representative.

Now Represented in California

The Colby Steel and Engineering Company, with head office and shops in Seattle, have extended the territory of J. S. Carswell for the sales and service of Colby cranes, marine elevators and other products manufactured by the company to include the State of California.

Mr. Carswell's new office has recently been opened at 417 Market Street, San Francisco 5, and has been placed in charge of E. Harold Biddison, resident manager. The telephone number is Exbrook 1048. Additional engineers for sales and service will be added to the San Francisco staff as the work requires. This office is now in a position to render prompt service and furnish full information on the equipment manufactured by the firm.

For over twenty years Mr. Carswell has represented the Colby Company on the Atlantic Seaboard, maintaining offices at No. Exchange place, New Jersey City, N. J., and 15 Park Row, New York City. With the experience he and his staff have had with the products, this new arrangement will enable both companies to keep more closely in touch with the owners and operators of the firm's equipment throughout the United States.



The G-E line of reliable, economical Compressor Units is designed in a range of sizes to meet *every* marine refrigeration need—aboard ship and in the yard.

Single units, similar to the type illustrated, are built in sizes from 3 to 75 hp. *Duplex* units—combining two refrigerating machines on a single base—provide a still wider range of capacities, and in addition conserve valuable shipboard space . . . reduce time and labor needed for installation.

Both single and duplex types offer all the design and service advantages that have made G-E refrigerating machines famous for long life, dependability, and low power consumption . . . and incorporate also the special features needed for marine applications.

Besides these Compressor Units, the G-E line of marine refrigeration equipment includes all the controls and accessories needed for *complete* refrigeration systems. "Freon-12" Condensers and Receivers; Conditioned-Air Cooling Units; Cooling and Heating Coils; Control Cabinets, Storage Cabinets, Water Coolers: all are available from G-E.

Get your free copy of the new Marine Booklet describing this complete line of G-E Marine Refrigeration Equipment. Write to *General Electric Company, Marine Sales, Air Conditioning and Commercial Refrigeration Divisions, Section 497 Bloomfield, New Jersey.*

☆ BUY WAR BONDS ☆

Marine Refrigeration by

GENERAL ELECTRIC

Hear the General Electric Radio Programs: The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 p.m., EWT, NBC . . . "THE WORLD TODAY" News, Every Weekday, 6:45 p.m. EWT, CBS

Captain Edward Macauley

Macauley's Message to Seamen Everywhere

Captain Edward Macauley, deputy administrator, WSA, sent a stirring message of tribute and confidence to American Merchant Marine men on the seas shortly before the invasion got underway. It said:

"The men of the Merchant Marine were among the first to see the issues of this war plainly. You were the first Americans to volunteer and your brothers of the sea were the first Americans to die in this fight for freedom. The landing on the shores of France is the fruit of their sacrifice.

"In the name of those dead comrades I call on every seaman ashore to return to sea to finish the task which they began. Our nation and the allied cause need you. Many seamen have been drafted and many, many replacements are required to keep our ships sailing.

"In the precise timing of the great invasion machine, the Merchant Marine is an integral and essential gear. On the Channel beachheads and beyond, our heroic fighting men of the armed forces are counting on the fighting Merchant Marine. I know you will not fail them. The food, equipment, ammunition and supplies which are the very lifeblood of the invasion will be delivered. Stock piles, long building for this great day, as they are used up will be built again. Across the Atlantic, across the Channel, the bridge of supplies which you held so long and against such odds, will continue to hold secure. You will deliver the goods. God speed you."

Medical Depots in Major Ports

Eight major ports, including San Francisco, Portland, and Seattle, will have depots where supplies of essential drugs will be available for men of the American Merchant Marine. Supplies of penicillin, dried blood plasma, insecticide and quinine will be maintained in depots in the ports
of New York, New Orleans, Norf
Baltimore, Philadelphia, in addi
to the above Pacific Coast ports.

This will enable the operator
all WSA owned or chartered ves
to readily maintain a supply of es
ital medications. Supplies are to
allocated from the depots to op
tors on an actual cost basis.

New Pychoneurosis Drug

Maritime Activity Reports st
that the drug ergotamine tartrate
been rated so highly for relie
such physical manifestations of
choneurosis as nervousness, tr
bling and stomach upsets in tests
several hundred merchant sea
that the drug will be placed ab
all ships under WSA supervision

The drug cures the physical eff
of shell shock in two hours, per
nently and without harmful a
effects, according to Dr. Daniel B
deputy medical director for the W
Shipping Administration. He
that the drug will be used for
treatment of crew members suffe
from "convoy fatigue" or ba
strain. Dr. Bain told of cases
which men screaming and shakin
terror after a sea battle had b
promptly restored to normal by
ing ergotamine tartrate.

Dr. Robert G. Heath, chief m
cal officer of the Merchant Ma
Rest Cure Center at Sands Po
Long Island, is credited by Dr. B
as the discoverer of the drug's
cacy.

New Vice President of General Steamship Corporation

Harry S. Scott, president of General Steamship Corporation, announced that, effective immediately, **George B. Schirmer** was elected vice president of the firm.

Mr. Scott stated that Mr. Schirmer brings to the company a wealth of practical experience in vital phases of cargo handling and terminal operations and that the appointment is designed to supplement and strengthen the existing organization rather than to change the status or duties of other executives of the company.

George Schirmer is well known in San Francisco shipping circles. He has been engaged in waterfront operations for more than 25 years and has been active for several years as a director of Waterfront Employers Association.

New Sales Representative

The Frank Groves Company, 444 Brannan street, San Francisco, has been appointed northern California sales representative for the Vitrefrax Corporation of Los Angeles, manufacturers of refractories.

A warehouse stock of vitrefrax argon AA and vitco firebrick and other vitrefrax products will be carried in a large warehouse at 960 Seventh street, San Francisco.

The four employees displaying the Selby, Battersby's maritime "M" pennant are: Margaret Sears, Josephine Reilly, Mrs. Francis McGough, and Eileen Casey; the occasion, the award of the third gold star to the Company.

Necrology

The illustrious life of **Captain Farris J. Pierce**, a member of the San Francisco Bar Pilots since February 1, 1922, and a sea career dating back to 1909, ended suddenly with his death on June 19, abeam of pier 20, just as he was leaving his automobile to enter the U. S. Coast Guard headquarters.

Fifty-four years of age, Captain Pierce left a rich heritage to the profession which he followed since a boy. He worked his way up in the days when each advancement was won the hard way, starting a career by shipping as an ordinary seaman aboard the old Oceanic Line's Mariposa.

For the past several months he had been in ill health, but war demands for mariners and the fact that he held the rank of lieutenant commander in the Coast Guard, banished all importuning of his family to "take things a little easier."

His first command was the Pacific Mail steamer San Juan in March, 1919, and later he was on the Seneca, Newport, City of Para, Venezuela and Ecuador.

New Commander at San Francisco Port of Embarkation

Brigadier General C. H. Kells, former commanding general of the Boston Port of Embarkation, has succeeded Major General Frederick Gilbreath as commander of the San Francisco Port of Embarkation.

Major General Gilbreath has been assigned to command the new Army Service Forces Training Center at Ft. Lewis, Washington.

Brigadier General Kells, who entered the army 29 years ago as a private, was chief of army transport service at the time of Pearl Harbor. He served at Boston for a year and a half and introduced off-shore loading of heavy lift cargo and other innovations to facilitate loading operations.

He served overseas in the last war and was stationed later in the Philippines and Hawaii. He is 51. His new command includes San Francisco and Portland Ports of Embarkation and Vancouver Barracks, Washington.

(Continued from page 127)
The various committee heads are: Mrs. E. N. Babb, "Adopt a Ship"; Mrs. Gene Fitzmaurice, publicity; Mrs. Edward Harms, membership; Mrs. Bernard De Rochie, entertainment; Mrs. James S. Hines, program; Mrs. Frank E. Short, public relations; Mrs. Alfred Pittman, ways and means; Mrs. Emery Nortner, house committee; and Mrs. John D. Roberts, hostess committee.

The next meeting will be held at the Army Navy Club on Tuesday, July 11, at 2 p.m. in the Memorial Room, 560 Sutter Street, San Francisco.

Marine Electricians in San Francisco

The new San Francisco headquarters of Ets-Hokin & Galvan, marine electricians and marine electrical installers for C-O-Two fire equipment, is at 551 Mission Street, Zone 5. This new location is conveniently situated and has increased facilities for continuation of the war work.

Geodetic Survey Opens Offices in Portland

The Coast and Geodetic Survey is opening offices in Portland, Oregon, to aid in its proposed extensive field work in Washington and Oregon, according to an announcement made by Rear Admiral L. O. Colbert, director of the bureau.

In anticipation of increased civilian operation of planes and boats after the war, the bureau is preparing to meet a heavy demand for aeronautical and navigation charts, Admiral Colbert pointed out.

Admiral Griffin to Head PSNY

Rear Admiral Robert Melville Griffin is to be new commanding officer of the Puget Sound Navy Yard at Bremerton, according to a recent announcement by Rear Admiral S. A. Taffinder, commandant of the Thirteenth Naval District. Admiral Griffin has been in command of a Naval task force in the Pacific.

Admiral Taffinder has been commandant of the navy yard since March 31, 1942, having succeeded Vice Admiral C. S. Freeman when the latter moved to Seattle to devote all his time to his duties as district commandant. Admiral Taffinder remained commandant of the navy yard when he succeeded Vice Admiral Frank Jack Fletcher as commandant of the district last October.

Admiral Griffin, son of the late Rear Admiral Robert Stanislaus Griffin, was born in Washington, D. C., in 1890 and was graduated from the U. S. Naval Academy in 1911. He saw destroyer duty in the North Atlantic during the first World War, winning the Navy Cross for "distinguished service in the anti-submarine section in the forces abroad." He was promoted to the rank of rear admiral on December 6, 1942.

Steering Gear Gets "M"

From the manufacture of planers, matchers and other woodworking machinery to the manufacture of complete electro-hydraulic steering engines and hydraulic transmission pumps for tankers and aircraft carriers, sounds like a long jump. Actually for Stetson-Ross Company, Seattle, Wash., precision machine manufacturers, it was more a matter of "know how" built up over a long period of experience in building fine finishing machines for the lumber industry.

However, the need of great numbers of these units by the U. S. Maritime Commission has given the organization the opportunity to demonstrate its skill and capacity to manufacture precision machines on a high production basis. As stated by Allen D. MacLean, director of Production for the Maritime Commission, when he personally made the presentation of the Maritime "M" Award, the thorough manner with which the job was done is one of the high lights in this war of production.

In a program held on Saturday, April 8, the Maritime "M" Pennant and the Victory Fleet flag was officially presented by Mr. MacLean to the company. They were accepted for the company by W. T. Pritchard, president of the firm.

The program was followed by a tour of the plant conducted by a group of leading men in the organization, as guides. Great interest was shown in the cutaway model of the intricate Waterbury hydraulic transmission pump, which the company manufactures under special royalty-free license arrangements with the Sperry Corporation.

Many watched eagerly the operation of the completed electro-hydraulic steering engine undergoing routine tests. All work in the plant went on as usual except for a 35-minute period during the presentation program and this feature gave many their first opportunity to see a precision machinery production plant in actual operation.

Buda Wins "E" Award

The Buda Company, which has been involved almost 100 per cent in the war effort for the last four years in the production of diesel and gasoline engines, generator sets, fire pumps, lifting jacks and various railroad equipment for the U. S. Army and Navy, was awarded the Army-Navy "E" Flag for excellence in production. The ceremony was held on April 27, 1944. It was attended by over 5000 people including employees and guests. Colonel Luke W. Finlay, Executive to Chief of Transportation Corps, Washington, D. C., was the principal speaker; and the "E" Flag was accepted by Mr. J. S. Dempsey, president of the company.

One of the outstanding points of interest of the "E" ceremony was a product exhibit of from 20 to 30 representative products, which are supplied the various branches of the Armed Forces.

Navy Request Brings Williamson to Coast

William R. Williamson, development engineer of the Maxim Silencer Company of Hartford, visited the company's San Francisco sales representatives, the Eugene V. Winter Company, during June. Mr. Williamson came to the Coast at the request of the Navy Department, to acquaint officers with the advantages of waste heat boilers. He also visited Southern California in connection with installations of waste heat boilers in that territory.

Pacific Valve Awarded Maritime "M"

Brief, but impressive ceremonies marked the award on May 10, 1944, of the Maritime "M", the Victory Fleet Flag, and Labor Merit Badges to Pacific Valve & Pump Exchange, 2976 Cherry Avenue, Long Beach, California.

The significance of the Maritime "M" and Victory Fleet Flag for outstanding production achievement, is generally understood. The Labor Merit Badges are a somewhat rare award, and indicate in this award an outstanding attendance record of 98.23% (after deductions for absenteeism, injuries and sickness) for all Pacific Valve employees for the entire year of 1943.

The prompt wartime conversion of Pacific Valve & Pump Exchange fom a ten-year-old concern engaged in the reconditioning of valves, to the manufacture and delivery of 25,000 marine valve, and of many types and sizes, in a 22-month period, constitutes another of those industrial miracles accomplished by American management and workers.

(Left to right) Charles E. Walsh, Jr., director of Procurement, U. S. Maritime Commission; Howad C., Irving M., Robert P., and John F. Dumm, partners, Pacific Valve & Pump Exchange; and Mrs. Charlotte M. Dumm, their proud mother.

Safety Award

A brief but impressive ceremony attended the presentation to Caterpillar Tractor Co. and employees of the "S" Award for Safety by the National Safety Council, between opening games of the baseball season at Tom Connor Field in Peoria, Illinois.

John M. Roche, director of the Industrial Division of the Council presented the framed Special Wartime Award for Distinguished Service to Safety and a pennant bearing the universal emblem of safety and an "S" to L. B. Neumiller, president, and H. S. Simpson, safety engineer for Caterpillar.

Northern California Firms Win "E" Award

For outstanding achievement in the production of auxiliary vessels for the Navy, the Army-Navy "E" has been awarded to employees and management of the Basalt Rock Company of Napa, California.

Likewise for efficient and speedy work in the construction of docks, piers and other waterfront facilities at the Naval Drydocks, Hunter's Point, the Army-Navy "E" has been awarded to Ben C. Gerwick, Inc., contractors.

Plant Rubber Award

The unprecedented feat of increasing production 210 per cent over normal plant capacity, on June 14 earned Plant Rubber & Asbestos Works of San Francisco the Army-Navy "E" Flag with Star for continued meritorious production performance and excellence of product.

To accomplish this notable industrial performance the works has been in continuous operation, twenty-four hours a day, seven days a week, including holidays, since December 7, 1941, turning out precision-molded 85 per cent magnesia, light-weight heat insulating material.

The employees witnessed the presentation of the "E" Flag in the Plant yards, when Lt. (j.g.) W. M. Harmon, U.S.N.R., of the Technical Section, Office of Inspector of Naval Material, turned the flag over to R. H. Chase, vice president and general manager, who presented it to the Plant employees.

Present production of Plant Rubber & Asbestos Works precision-molded 85 per cent magnesia goes one hundred per cent to Army, Navy, Maritime Commission and vital war industries, and is used for weight-saving and fast installation on heat-insulating jobs in all U. S. Navy Yards.

Chairman of the Ceremonies was S. A. Abrahams, factories manager.

KEEP 'EM IN SERVICE WITH HSGI WEAR RESISTING PARTS

Our fighting Forces must be transported and kept supplied. Every merchant and Naval vessel is a vital unit to victorious conclusion of this war.

Wearing parts inside the cylinders of Diesel and steam reciprocating engines on these ships are an important factor.

Applications of wear-resisting HUNT-SPILLER AIR FURNACE GUN IRON Cylinder Liners, Heads, Pistons and Piston Rings will give maximum service between renewals and aid in the reduction of fuel and lubrication costs.

Regardless of age, make or design of engine, H.S.G.I. parts applied to your cylinders will produce maximum efficiency and help you to Keep 'Em in Service.

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HUNT-SPILLER Air Furnace GUN IRON

—Fast....Thorough....Dependable Ship Service—

THE FEDDE PROCESS, EQUIPMENT AND STAFF, HAVE BEEN THE **"TOPS"** IN ALL PHASES OF **MARINE CLEANING.**

Our Portable
Steam Cleaners
Are Moved to Your Job
When and Where
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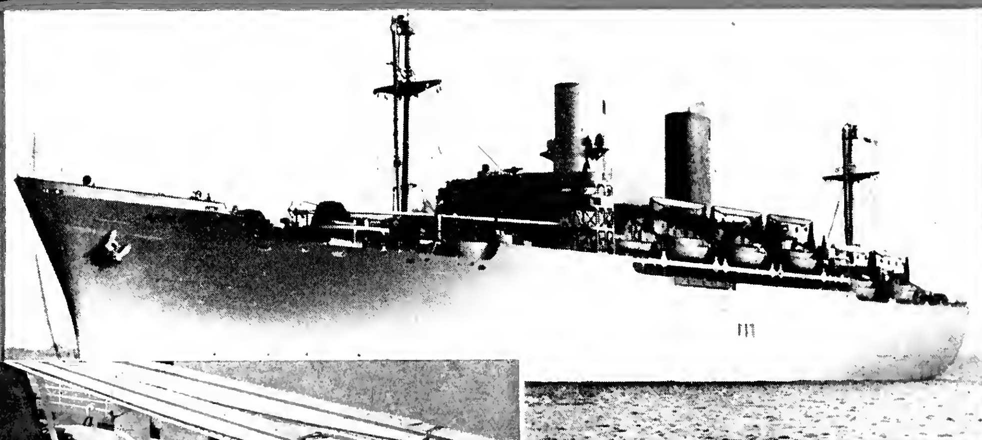
Pacific
MARINE
REVIEW

AUGUST 194

METALUMBER

THE PIONEER
STEEL HATCH COVERS

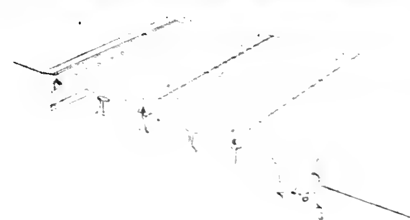


SAVE WEIGHT AND SPEED CARGO OPERATION

Greater strength permits approved spacing of strongbeams for unsupported spans up to 10 feet affording elimination of more than one-half the strongbeams mandatory with wood and other types of portable steel hatch boards.

WOODEN HATCH COVERS

(20′x27′ hatch) Total weight of covers, strong-beams and fittings, 12,860 lbs.



METALUMBER

(20′x27′ hatch) Total weight of covers, strong-beams and fittings, 10,090 lbs.

insulated and inter-
...ng — provide a closer degree of temperature con-
...and tightly closed hatchways. Durable — Buoyant
... landled without mechanical aids.

...d by leading American Steamship Companies for
...past 8 years. Approved by Classification Societies
...presently being fitted to various classes of vessels
...the Army Transportation Corps, the U. S. Navy,
...the Maritime Commission.

...epresented and Manufactured on West Coast by

...EL & PFEFFER IRON WORKS, INC.
TENTH AND HARRISON STREETS

THE METAL LUMBER COMPANY
201-211 HARRISON STREET • HOBOKEN, N. J.

Maritime school instruction in tying a barrel sling

TUBBS CORDAGE COMPANY
EXTRA SUPERIOR MANILA
SAN FRANCISCO

PORTLAND CORDAGE
CLOVER LEAF MANILA
COMPANY

Lest You Forget
these famous tr
marks that stan
the utmost in
dependabilit

Here's the
way to tie
painter's s

Helping TO KEEP 'EM SAILING

As important as the part rope is playing on America's fighting fronts, is the job it is doing in training and preparing our boys in service for the task ahead.

In the U. S. Maritime Service, as an example, rope is doing an important job in San Francisco's Upgrading School in preparing ordinary seamen to become able bodied seamen. In this school, a special rope class is conducted to familiarize the men with all phases of rope usage.

Because rope is so vitally needed — not only for jobs like this but in every phase of our war effort—it is important that you conserve it and replace only when needed. When you do replace you can be sure of maximum value by specifying TUBBS and PORTLAND rope to your supplier.

Rope sling instruction

Send for booklet
"Care of Rope"
and other

TUBBS CORDAGE COMPANY
200 Bush St., San Francisco 4, Calif.
CHICAGO • LOS ANGELES

PORTLAND CORDAGE COMPANY
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An officer transferring to an aircraft carrier from the destroyer that braught him alongside, with both vessels steaming at full speed.

Pacific MARINE REVIEW

Retrospect and Prospect

Much is being said and written these days about our failure to "keep our merchant marine" after World War I, but very little factual material seems to be in evidence as to just what happened to "our merchant marine" during that period.

Let's look at the record.

In the spring of 1916, with Europe hard at war, our exports were piling up on the docks for lack of bottoms. Every available American shipyard was full of hulls building for European shipowners. President Wilson and Congress took notice and formed the U. S. Shipping Board, with an appropriation of $50,000,000, to build a fleet of commercial cargo carriers to be operated by that agency until they could be sold to private American operators. U.S.S.B. surveyed the situation and formed the U. S. Emergency Fleet Corporation in order to have an agency that could contract for building and could operate ships as a pseudo-private corporation.

According to "Merchant Marine Statistics," published by U. S. Department of Commerce, there was, as of June 30, 1916, a fleet of 6824 American steamers aggregating 5,895,095 gross tons. Many of these were old and slow, and note that the average measurement was 863 gross tons. A considerable proportion, perhaps over 50 per cent, of these vessels were such special types as tankers, coastwise passengers, colliers and Great Lakes bulk carriers.

Before the program of the original Shipping Board could be put into effect we entered the war. Congress voted a $4,000,000,000 appropriation for merchant ships to President Wilson. The President immediately turned this over to the Shipping Board, and that Federal agency took charge of all American shipbuilding. This was in April, 1917.

As of June 30, 1917, the fleet had grown to 6736 steamers, with an aggregate measurement of 6,196,535. By June 30, 1919, seven and a half months after the Armistice date, this fleet had grown to 7397 steamers with a total measurement of 10,057,400 gross tons. Every available shipbuilding way in America, including the so-called "war baby" yards, was building hulls and had contracts ahead for from one to three years. These contracts were practically all honored by E.F.C., and by June 30, 1922, the American fleet had 8177 steamers with a total measurement of 15,606,726 gross tons. Note that the average capacity of the American steamer increased by over 100 per cent during this period, and the total capacity of the fleet increased by over 200 per cent.

As of January 1, 1919, the entire shipping world was clamoring for cargo carriers, and ordinary steamers ready for sea could be sold at $200 or more per deadweight ton. We could have sold much of our war-built fleet and most of the nearly-ready for delivery fleet at these high prices. However a propaganda was raised to the effect that we should "keep every ship" and "capture the ocean trade of the world." Had we, at that time, sold our slow war-built freighters as Britain did on the world's markets and shifted our shipbuilding program (as every other shipbuilding country did) to faster, more up-to-date types, we would have gone through the inter-war period with a far better balanced merchant marine and a much more stable shipbuilding industry.

In deference to the popular clamor, Congress and E.F.C. decided to operate the war fleet. E.F.C. fixed up an agency contract for operators based on Government ownership of hulls and Government payment of all expenses plus a percentage of gross as an agency fee. This effectually discouraged all private ownership and gave American operators a very vicious training in the best ways of running the American ocean - going merchant marine into a troubled sea of red ink. Congress in three years of this type of operation found itself embarrassed by the mounting costs of the scheme, and ordered the ships sold. But by this time the world market, for such ships ready for sea, had dropped to around $25 per deadweight ton, and before the ships were all sold, dropped to as low as $6 per dwt. Many of the hulls delivered in the latter part of this period went directly from the builders' yards to the lay-up anchorages in some quiet cove or river.

As of January 1, 1941 (the latest Department of Commerce figures), our merchant fleet had 3965 steamers, with a total measurement of 9,813,538 gross tons. Note again the great increase in average capacity, and that at the opening of World War II, about 12 months after the above date, we would have a smaller number of steamers but a larger total capacity than we had on the date of the Armistice that closed World War I.

At the present time we own a fleet of more than double the capacity of that which we had at the close of World War I, and before the war is over our fleet will be more than three times the capacity of that former fleet.

If we insist on keeping a fleet of such size and working it under Government operation in peace time, the American Merchant Marine may suffer the same dissillusionment as the poet who:

"Looked behind to find his past
and lo
It had gone before."

"Human Torpedoes"

The British Navy's "human torpedoes" are revealed to have been first used when the Italian cruiser Ulpio Traiano was sunk in the harbor of Palermo, Sicily, in January, 1943. They are driven by two men riding astride them. When they reach their target the torpedoes dive under ship, where the crew fixes the explosive portion of the torpedo to the hull of the ship, sets the time fuse, and slips out of range on the remaining electrically - driven portion. Here is shown an officer in his Sladen Suit.

After the King's recent visit to the Navy the Admiralty released some details about the "human torpedoes" and their crews.

In the Navy they are known as "underwater jeeps." Their color is green; they are 21 feet long and look like ordinary torpedoes, but have three camel-like humps on their backs. The first two humps are water-shields to shelter the crew; the third contains the gear.

The crew is two men. Their Action Stations are astride the torpedo. Action Station No. 1 is behind the war-head, which contains the explosive charge. Its occupant steers the torpedo with a rubber handled "joy-stick," below which there is a dashboard of luminous dials registering the pressure and the depth.

Action Station No. 2 is behind the second hump. Its occupant attaches the war-head to the bottom of the enemy ship.

The war-head contains a weight of explosive equal to that of an ordinary torpedo. It also has a clockwork device which times the charge to explode after the crew has got away.

The engine of the torpedo is electrically operated by batteries. The speed has not been made public, but it is presumed to be quite low.

The crew is dressed in several layers of thick woolen clothing, over which it wears a 40-pound diving suit with a visor. Each man carries an oxygen tube in his mouth and small oxygen bottles strapped on his back. The clothes are scientifically designed so that the normal blood circulation is maintained, even under water.

The men who ride the torpedoes are all volunteers. The long odds against their safe return are made fully known to them, but there have always been plenty to volunteer despite this. Training takes 4½ months, and is conducted under strict secrecy in a northern part of Great Britain, some miles from the nearest town. The medical examination is extremely stiff. About 30 per cent fail to complete their training for medical or other reasons.

The "human tarpedo" under way.

Views of the torpedo moving through the water with its two-man crew.

A Hospital for Wounded Ships

America and its allies are faced with the huge problem of getting men to the far-flung battle fronts, and with the problem of continuing to send them food, clothing, weapons and ammunition. This is, in short, the greatest sea transportation problem of all time. It is global logistics.

Recently a Russian ship, rammed by another in an accident, arrived at the establishment of Poole, McGonigle and Jennings in Portland, appearing as pictured below.

Poole, McGonigle and Jennings of Portland, Oregon, visualizing the scarcity of ships to solve this problem, placed in operation all of their facilities for the repairing and renewing of ships that had to run the Axis gantlet. Their plant became, in fact, a "hospital for wounded ships." Twisted and battered hulls of steel limp into the firm's docks, where reconstruction crews revitalize them in record time for a return down the Williamette River and out to sea again to deliver urgently needed war supplies.

Such an undertaking demands gigantic facilities and an ample supply of expert craftsmanship. This Portland firm has both. It has at its disposal machinery that is capable of rolling out thousands of feet of steel plate per day, enormous presses, drills, lathes and many other items of machinery for making or renewing any part of a ship or its propulsion gear. It is able to berth eight ships simultaneously; it has the Port of Portland drydock available for jobs needing to be lifted out of the water; and the firm's partners own the largest plate shop in the city.

The company's plant is advantageously located on Portland's fresh water harbor. More than 3500 men are employed by the firm, and the supervisory personnel consists of the most experienced technicians and ship repairers available. Superintendents, foremen and leadermen have all had at least 20 years of experience in repair and conversion work.

At these repair docks, more than 300 ships have been made seaworthy since the firm organized in February of 1942. A large portion of these contracts are jobs for lend-lease. Many Russian ships coming in have been practically rebuilt and equipped with gun foundations and armament. Cargo ships are converted to troop transports. Superstructures have been

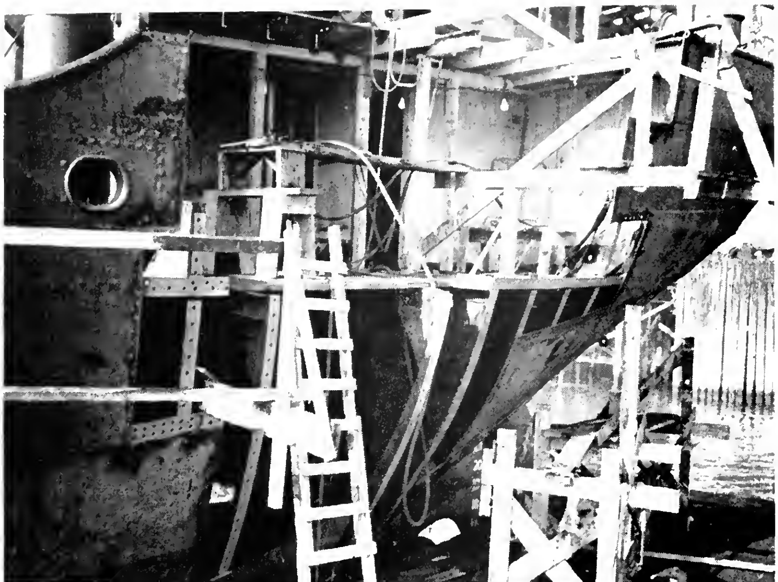
(1) E. L. Buchanan, assistant general manager. (2) R. L. Schultz, plant manager. (3) A. Matson, superintendent. (4) M. W. Case, assistant superintendent. (5) John T. Nelson, purchasing agent. (6) Lyle T. Duncan, paymaster. (7) Donald Foley, office manager. (8) Everett Floren, auditor. (9) Harold Nelson, personnel. (10) L. C. Kelker, general shop foreman. (11) Bill Lewis, engineering. (12) C. B. Watrous, master machinist. (13) John Bekooy, master hull constructor. (14) J. F. Matheison, master pipefitter. (15) Charles Topp, master shipwright. (16) Max J. Koliwer, master electrician. (17) F. A. Klawa, general foreman, electrical maintenance. (18) J. W. Griffith, foreman, sheet metal. (19) F. C. Games, master rigger. (20) S. Holmes, plate shop foreman. (21) H. D. Ets, paint foreman.

built for seven tankers. Cargo ships are transformed into floating repair shops.

The original organization of Poole and McGonigle was formed in 1914 by Otho Poole and Charles McGonigle, experienced structural engineers, for the purpose of engaging in the manufacture and erection of bridges, buildings and miscellaneous steel structures.

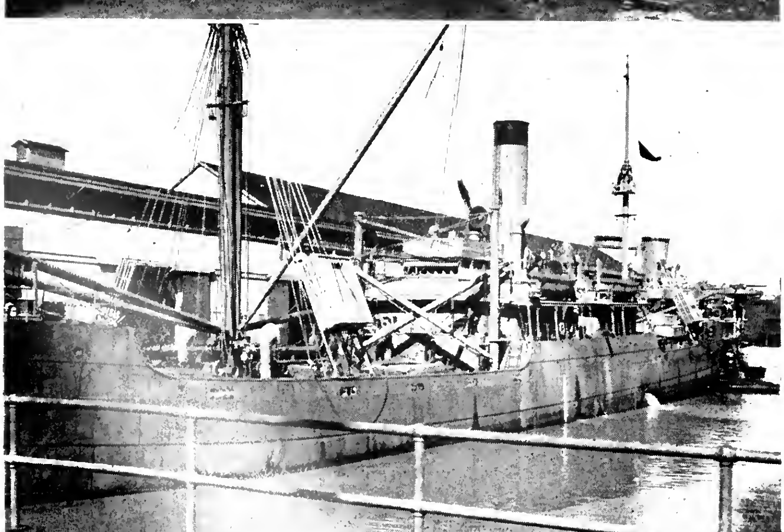
During the emergencies of World War I, in addition to their regular line, they manufactured boilers, tanks, masts, deck houses and other items for the shipbuilding yards of the Pacific Northwest.

Upon completion of their war production orders in 1919, the steel construction line became very active, and in order to provide for the greatly in-



Immediately experienced crews set to work removing damaged plates and decking, and soon the vessel was ready for the installation of new plates and bulkheads.

Within but a few days the ship was refloated, with only a patch of gleaming new paint to reveal the fact that skilled hands had been at work repairing war damage.



Soon the crippled ship was restored to seaworthiness, and is here seen being loaded with vital war material, ready to ply the seven seas as a part of her important job of helping to win the war.

creased amount of business available, they constructed the largest steel fabricating plant in the city of Portland. Its main shops cover an area of more than 125,000 square feet, and are exceptionally well served by rail and truck lines. During the years prior to the present war the firm constructed many of the outstanding bridge and building developments of the Pacific Coast.

At the outbreak of World War II and the subsequent exceptional demand for steel fabrication, the company sought an opportunity to employ its facilities to capacity and to be of as much service as possible during the emergency. After investigating various lines of war work, it was determined that the most useful field on the West Coast would be the repairing and reconditioning of ships already in commission and urgently needed by the United States in shipping supplies to allied nations.

To carry out this plan, a new partnership was formed with J. L. Jennings, an experienced marine engineer and shipbuilder. On February 1, 1942, the three partners established their marine division and leased a site at Terminal Number One, owned by the Commission of Public Docks at Portland. This property covers 15 acres and has over 100,000 square feet under roof. Facilities for berthing three ships are available along the dock wall in the center of metropolitan Portland.

Jack Jennings is remembered as the general manager of the Industrial Division of the Iron Fireman Manufacturing Company, which was delivering a 2500-hp triple-expansion marine engine every day until the plant was destroyed by fire.

A Remarkable Diesel Towboat Record

ON JANUARY 1, 1940, the Columbia-Snake River Towing Company of The Dalles, Oregon, placed in operation the new steel towboat Keith. This boat, built by the Commercial Iron Works of Portland, Oregon, was considered at the time to be very outstanding, both in hull construction and in power plant. The lines for the hull and its structural arrangement were developed by the veteran Pacific Coast Naval Architect, L. H. Coolidge of Seattle, and the power plant was designed and built by Enterprise Engine and Foundry Company of San Francisco, California.

Briefly, this hull is 92′ 6″ long, 25′ 6″ beam, and 6′ 6″ deep. It is all of steel welded and is stiffened by a 24-inch-wide hollow steel girder made up of ¼-inch plates welded oil-tight. This girder extends from the bottom to the deck and runs for five-sixths of the ship's length. It not only stiffens the hull structure but also provides tank space for 800 gallons of water, 150 gallons of lube oil and 5000 gallons of diesel fuel oil.

This towboat was especially designed for year-round operation in the swift waters of the upper Columbia, from The Dalles, Oregon, to Umatilla, Oregon (100 miles), and from The Dalles, Oregon, to Pasco, Washington (150 miles), in each case pushing 1000-ton specially designed steel barges. The average river current in these stretches is 5 miles per hour; the maximum current in rapids is 15 miles per hour. The conditions were such that the maximum allowable draft, fully loaded, was 42 inches, and 2000 shp of propulsion power was necessary to overcome the swift water.

These requirements posed a problem exceedingly difficult with ordinary commercial prime movers. However the technical staff of Enterprise had been doing some competent research, and they proposed two especially designed six-cylinder, 12″ bore, 15″ stroke, four-cycle diesels guaranteed to produce 1000 shp when equipped with Buchi type exhaust gas turbine superchargers. This was a bold stroke, since no comparable supercharged diesel plant existed in America at that time. The towing firm and the engine firm got together, and the contract was let. The installation was made with great care, the

1000-ton barge with towboat Keith pushing.

View of Columbia River towboat Keith from port forward quarter.

engines being mounted on Korfund vibration dampeners and connected to the propeller shafts through Thomas couplings and a flexible hollow shaft. Nearly all the experts, individually and collectively, shook their heads and predicted failure for the Keith.

This towboat has now, in her fifth year of operation, a very remarkable record of economical performance, as shown by reports from the Columbia-Snake River Towing Company in the form of abstracts from the ship's log and from their office records.

As of April 24, 1944, towboat Keith had been in commission four years, three months and 15 days. That aggregates 1567 days, of which the tug had been in active towing work 1469 days, or actual running time of 35,136 hours.

The following abstracts from the log show the lay-off time for each year and the cause thereof:

1940—Keith was out of operation 48 days due to the fact that the Army Engineers were repairing Celilo Canal and all navigation on the upper river was stopped during the latter part of 1940 and first few days of 1941.

1941—Out of operation a total of 22 days, of which 17 were due to repairs to Celilo Canal, and 7 days to hull and engine repairs.

1942—Out of service 19 days for hull and engine repairs.

1943—Out of service 15 days due to ice in Columbia. This time was used in drydocking for hull inspection and tear-down and inspection of engines.

1944—Up to April 24, the Keith lost 24 hours for engine repairs.

Normal rpm of engines in the quiet parts of the river is 600. This is increased to 650 to 675 rpm in rapids. For each up-river trip, the engines turn 675 rpm for approximately 45 minutes. The propellers have a diameter of 52 inches and a pitch of 36 inches. The average running speed, with loaded barge, is 12 mph.

Normally the cargo pushed up the river by this towboat on her regular runs approximates 200,000 tons, and in addition she does considerable general towing work. During 1943 she pushed 215,118 tons up the river, which was more than half of all the tonnage moved by all the tugs operating on this run.

From February 8, 1943, to April 23, 1944, Keith ran continuously 24 hours a day. During this period each engine was closed down a few hours a month for change of lubricating oil. This was always done on the downstream run between rapids. On April 10 of this year, trouble developed in one cylinder of one engine. On pulling the piston it was discovered that one of the rings had broken. A new ring was inserted and in two hours the engine was back in service.

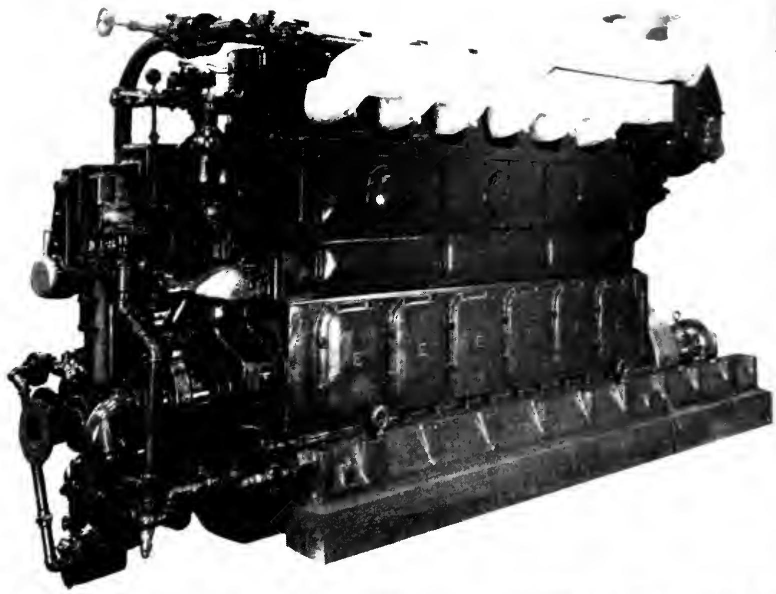
During the first year of service the towboat crews (being unfamiliar with the power possibilities in supercharging) did considerable experimenting with overloading. They discovered that the aluminum pistons would not stand the high tempera-

Towboat Keith viewed from port after quarter.

tures that were generated at high overloads. During this period 9 pistons were lost by this overheating. Tests were carried out that demonstrated the necessity of keeping exhaust temperatures below 1100° F.

On average operations at 600 rpm with supercharging, the exhaust temperature varies from 780° to 850° F., and on maximum output at 675 rpm it varies from 1000° to 1100° F.

The average yearly maintenance cost, including the pistons, was $2680.46, which works out at less than $0.0001, or one hundredth of a cent per ton mile, as applied to her



The D.M.G.-36 Enterprise diesel engine with Buchi supercharger. Two of these were installed on towboat Keith in 1939.

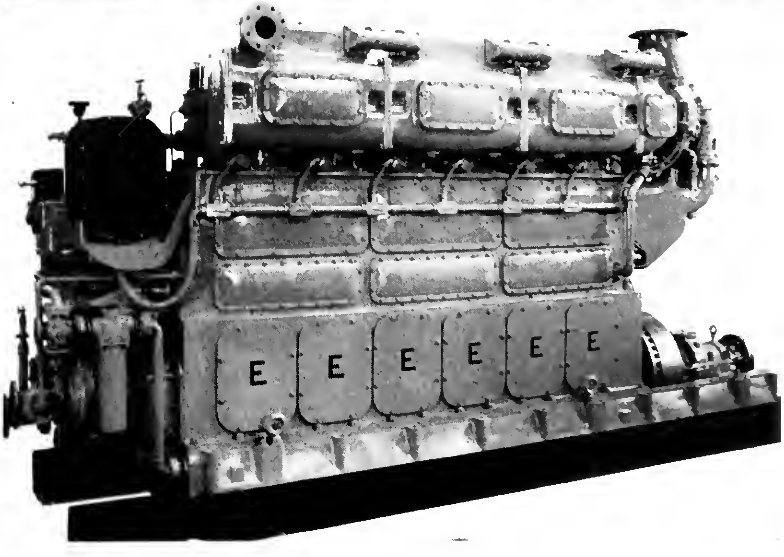
regular upstream barge trips, and without considering any miscellaneous towing work.

These are truly wonderful records, ınd the Keith, under the same capaɔle handling, will continue making such records for many years to come.

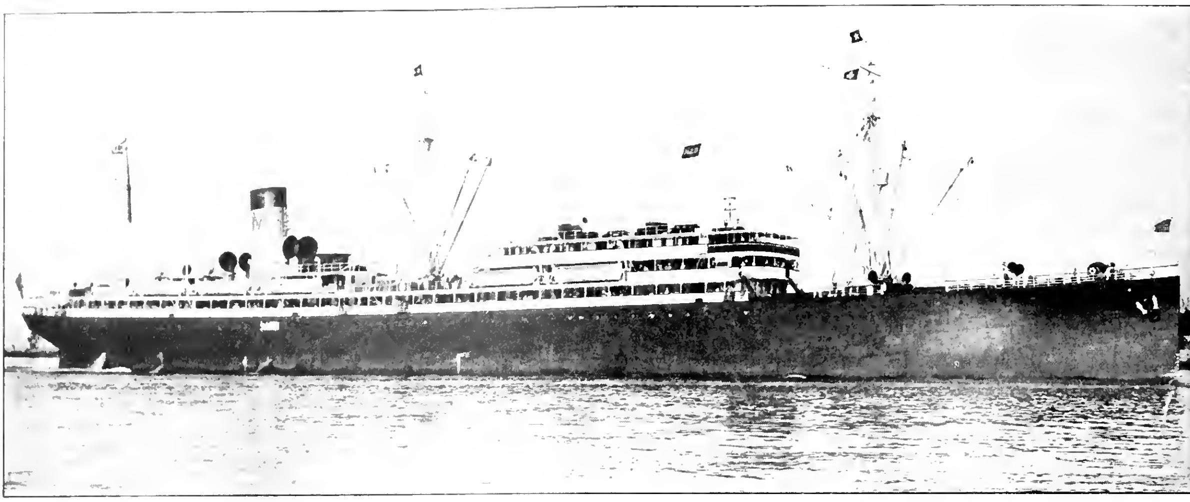
The Enterprise Engine and Foundry Company and the Columbia-Snake River Towing Company are ɔoth justly proud of this achievement. Captain A. Leppaluoto declares

Engine room of towboat Keith, showing tops of engine cylinders.

n a letter to the diesel engine firm: "During the past 14 months the Keith has run a strenuous schedule nd her engines have been in contant operation. We are indeed very roud of her crew and her propulion machinery, which enables her to et up this enviable record during hese past months . . . . In the writer's stimation, this is a record that I do ot believe ever has been equaled by ny diesel-powered craft."



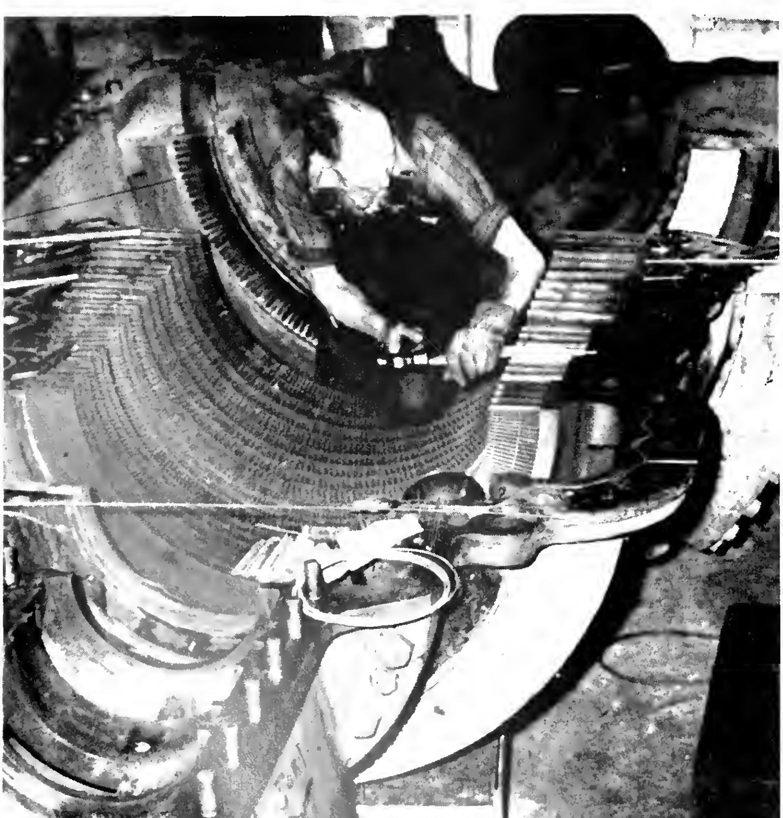
The modern (1944) streamline version of Enterprise D.M.G.-36 diesel engine with Elliot Buchi built-in supercharger.



The cargo and passenger liner Maui of the Matson Navigation Company's Honolulu service.

Rebladed Turbines Again Drive Veteran Maui

Fig. 1



Steaming across the Atlantic Ocean in 1918, the U. S. S. Maui, loaded to the Plimsoll line with supplies and Hun-hunting American soldiers, was part of the transport fleet during World War I. Now that we are again at war, this veteran of the seas—27 years old in March, 1944—is once more plying between American bases and overseas battle fronts.

The Maui was the first passenger vessel built in the United States to use turbine reduction gear drive. She is twin screw 10,000 shaft horsepower and develops a speed of 16 knots.

Built by the Union Iron Works, now the Bethlehem Steel Co., San Francisco, Calif., for the Matson Navigation Company for freight and passenger service between California and the Hawaiian Islands, the Maui has steamed approximately 1,500,000 miles during her years at sea. During all these years, she has been taken out of service for general turbine overhaul only twice.

During a general overhaul in 1926, several rows of blades were renewed in both the cylinder and spindle of

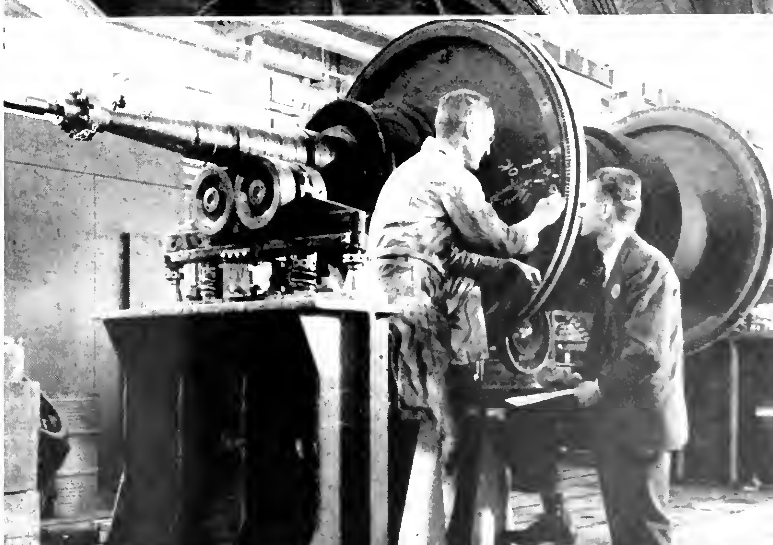
the high- and low-pressure turbines. A similar operation was completed recently at the Emeryville, Calif., plant of the Westinghouse Manufacturing and Repair department, when previously untouched blades were replaced.

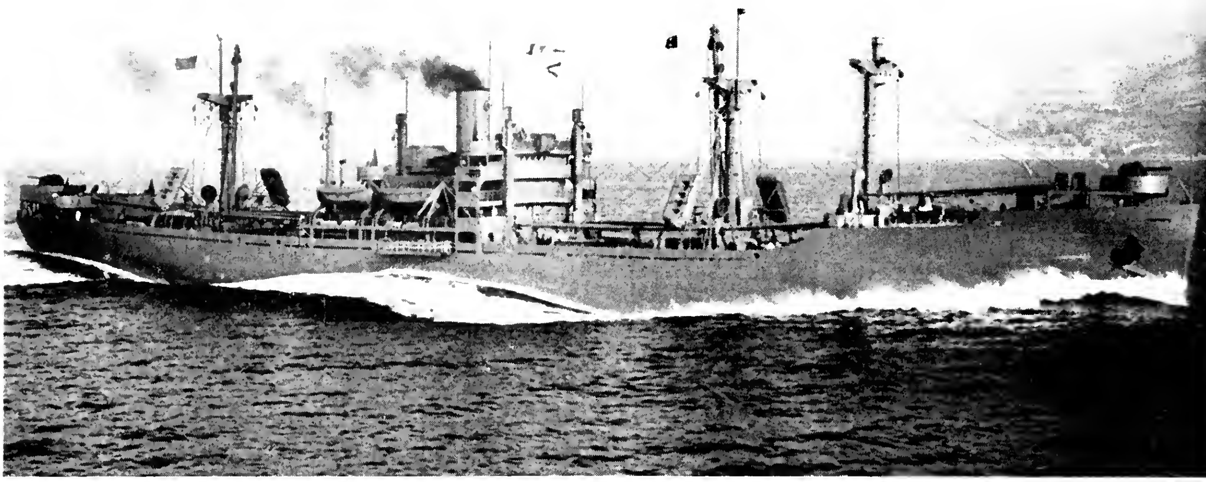
Our series of photographs shows the sequence of the operation. In Fig. 1, George W. James, machinist at the Westinghouse Emeryville plant, is tapping in special alloy steel blades in the lower half of the high-pressure turbine cylinder. In Fig. 2, Fred Thomas, left, and Jack Lilly, right, are at work blading the high-pressure spindle. Mr. Lilly, in Fig. 3—a practiced hand in marine turbine work who started with Westinghouse at the South Philadelphia, Pa., plant the same year the Maui was commissioned—is soldering in a retainer ring after a new row of blades have been driven in place.

Near the end of the repair journey through the shop, the balancing department takes over. Herbert Sandal, Westinghouse marine engineer, left, Fig. 4, is checking the balance of the six-ton high-pressure spindle on a dynamic balancing machine, while D. S. Day, inspector for the American Bureau of Shipping, is making a record of the procedure.

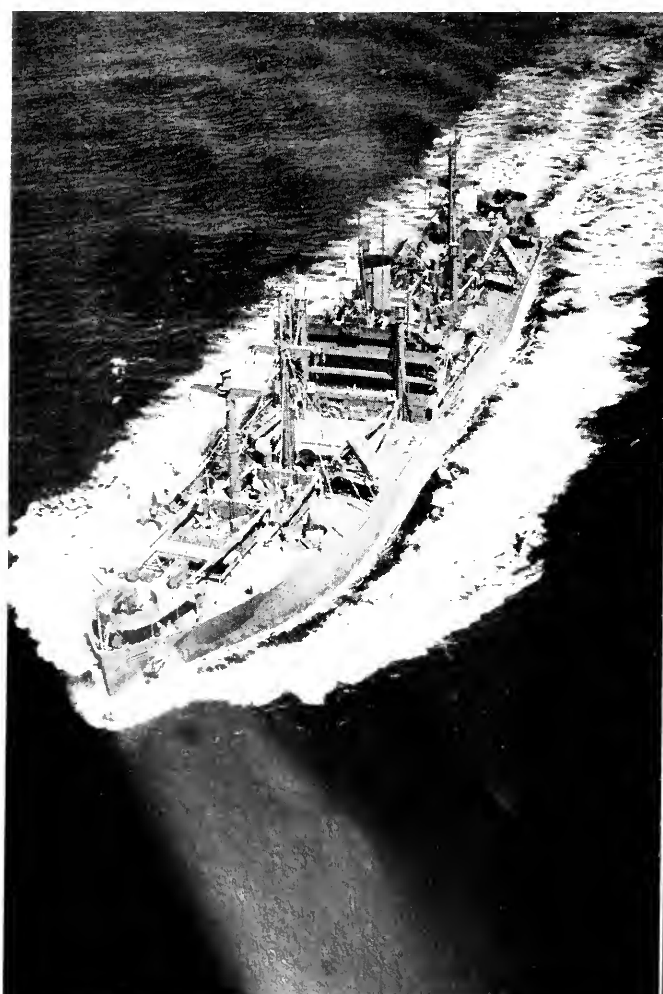
Figure 5 shows Joseph L. Spincich using three ounces of welding rod to a marked spot on the spindle where Engineer Sandal has indicated the point and angle of unbalance. Prior to application, the rod is weighed and the exact amount marked off. When this operation is completed, the turbine is ready to be reassembled and returned to the ship.

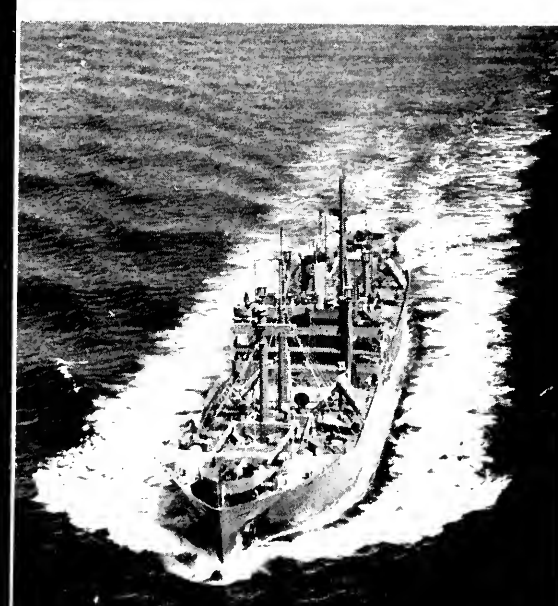
Figure 2 is shown at top of the page, Fig. 3 in the center, Fig. 4 at lower right, and Fig. 5 is below.

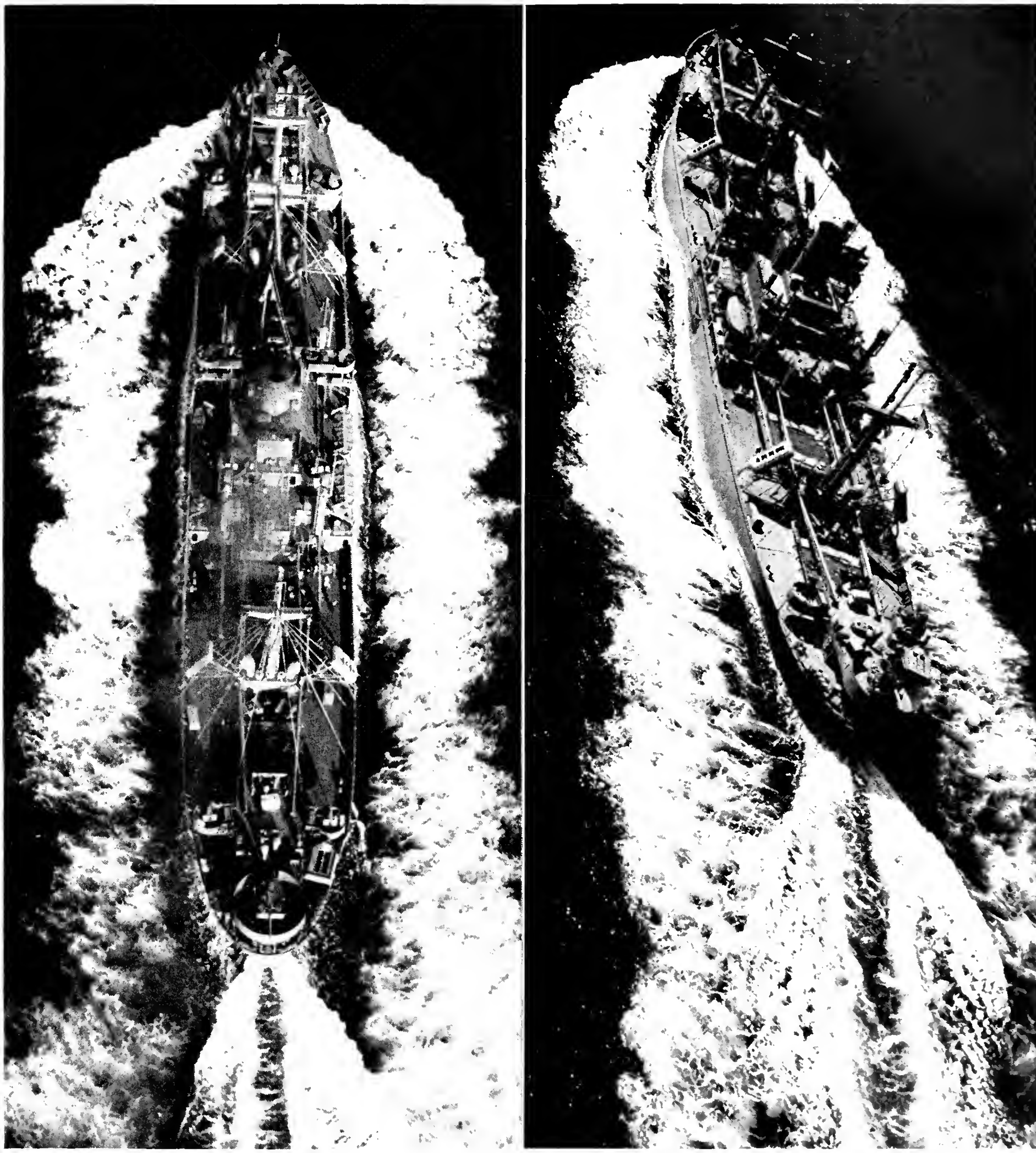




The Way of a Ship in the Sea







It was too hard for Solomon, but here it is presented with the aid of camera and blimp for leisurely study by the naval architect. These remarkable aerial pictures were taken from a blimp by the photographer for California Shipbuilding Corporation. They show the "Victory" type steamer Bluefield at full speed during her recent stabilization trials. Combined, they make an excellent study of wave and wake characteristics for this type of vessel.

(Official U. S. Navy and U. S. Maritime

Ships Built in Oil Field

With the launching of the FP-390 on June 14, a concrete pipe company built its fourth 175-foot steel freight and passenger ship in the middle of an oil field. Thus, under the pressure of war, do America and the United Concrete Pipe Corporation deliver the good sinews of war that are making maritime history.

Peacetime builders of concrete pipes and dams and tunnels, the company, whose main offices and yards are located at Baldwin Park just 35 miles from the Los Angeles-Long Beach Harbor, is doing an amazing job building these steel FP's for the U. S. Army. It trucks the sections in convoys to the firm's unusual yard at 1700 W. 9th Street, Long Beach.

This shipyard stretches 2250 feet in length between two rows of oil rigs 215 feet apart. There the sections are assembled on building slabs, moved on to the largest marine railway at the harbor, and launched. This yard sandblasts the rust from every piece of steel before it is painted. It is believed to be the only yard that does not employ women production workers, for there are no women welders, helpers or electricians at either the Baldwin Park plant or at the harbor shipyards.

Four Vessels Launched to Date

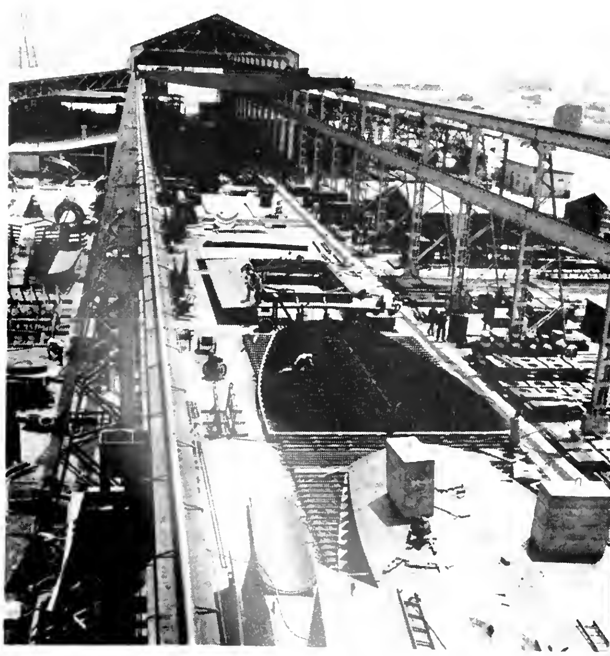
To date four different vessels have been launched. The first took about three months to build. President B. J. Ukropina says that the others are coming along faster. Other officers of the company include vice presidents Steve Kral, T. P. Polich and E. E. Hall; Cecil W. Drake, harbor marine engineer and administrative manager in charge of shipbuilding work; F. O. Mjellem, works manager; Harold Pope, assistant works manager; Roy Chinnici, superintendent of hulls; Paul Preston, chief engineer; and George Gammon, superintendent of machinery. Samuel Zimmerman is assistant to General Manager Cecil Drake.

The vessels being built are a new type of inter-island combination freight and passenger vessel utilized by the Army. Rated at 13 knots plus, their trial runs have indicated that the "plus" is attained.

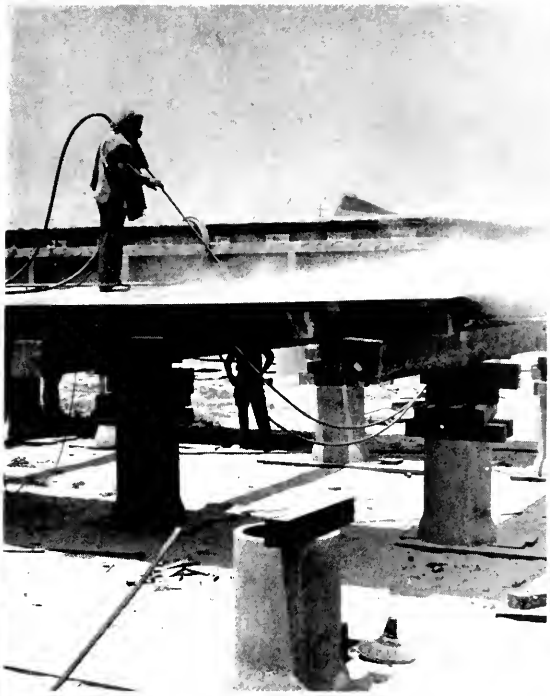
One feature of which the yard is particularly proud is its marine railway, which has 1500-ton capacity and can pull out from the water a ship 225 feet in length with a 40-foot beam for repairs as easily as it lowers one of the 175-ft. FP boats into the harbor. This marine railway extends 488 feet under water and 1400 feet on land. It was designed by Milton Shedd, company engineer.

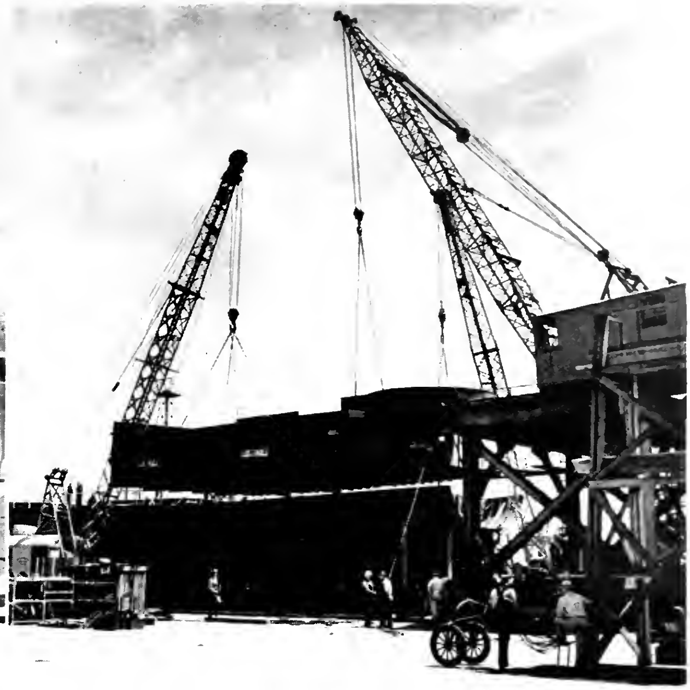
Recently a 40-ton deckhouse, the largest section ever built at Baldwin Park, was transported over the 35-mile route to the harbor on a huge truck and trailer. Three cranes lifted it into place. The six building slabs in the elongated yard employ approximately 1000 men.

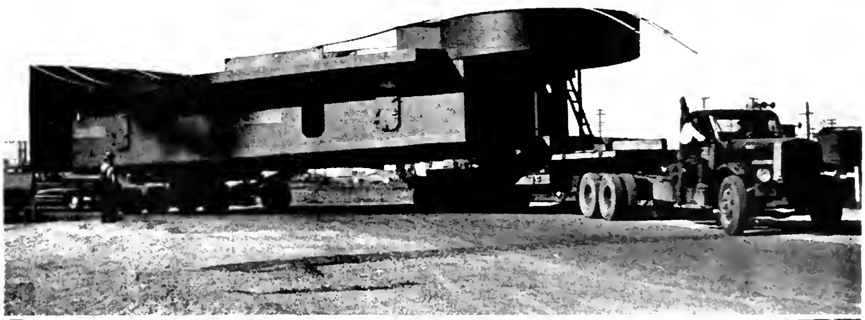
Part of the welding platens at the shipyard.

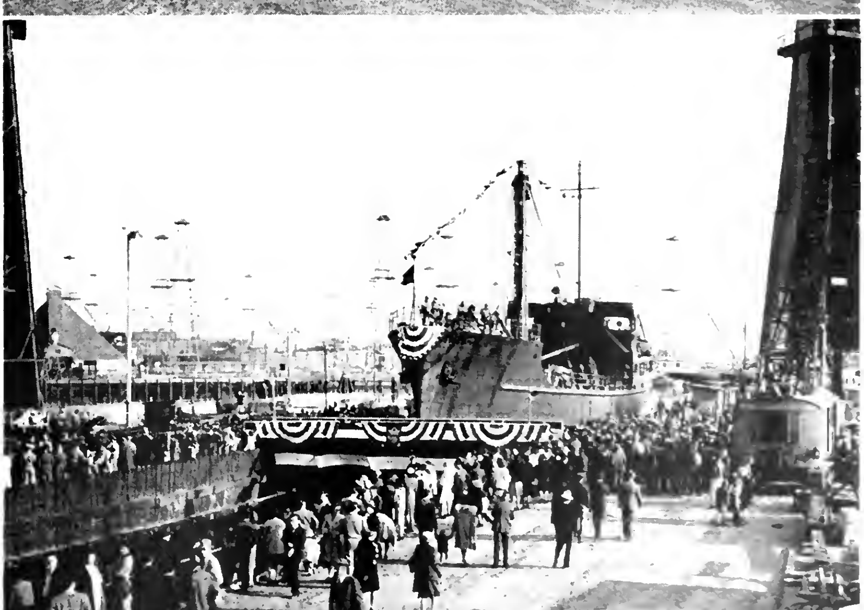


The fabricating shop.









Upper left: Rust is sand blasted from every piece of steel before it is painted.

Upper right: Eighty thousand pounds (40 tons) of deckhouse section being lifted into place on the hull.

Center: Preassembled sections like this 40-ton deckhouse are trucked on special trailers 35 miles from shop to shipyard.

Bottom: The FP 388, a finished ship, slides into the sea on the marine railway.

Fig. 1: Twin mine sweepers on the day of the launching.

(All photos Official U. S. Navy photos by Roy Ryerson)

Tandem Launchings of Mine Sweepers

By Marquand S. Gorton

ON THE 22nd of June of this year, the Ship Construction and Repair Division of Puget Sound Bridge and Dredging Company (formerly Associated Shipbuilders) conducted the sixth double launching of two fleet mine sweepers for the United States Navy. These launchings were unique in that the two vessels were launched from the same set of groundways on the same high tide; building ways as constructed were designed to accommodate vessels up to 450 feet in length. Inasmuch as the vessels for which Puget Sound Bridge and Dredging Company received contracts at the time the building ways were completed had an overall length of 220 feet, it was necessary to lay two keels in tandem (see Fig. 1) on the ways in order to utilize fully the available building space.

This unusual condition presented several interesting problems in the design of the groundways and launching cradle and the scheduling of the activities on the day of the launching. To launch two hulls in succession within a relatively short period of time, the most important consideration was that the lower of the two vessels be launched without damage to the launching grease and that the ways be cleared of all gear preparatory to the launching of the next, or upper, vessel. In addition, due to the long, dry run of the upper hull, and due to the restriction of the channel off the ways, some positive means for slowing the ship down had to be used.

Slope of Ways

In order to gain sufficient declivity for a successful launching, the slope of the groundways was set at ⅝ inch per foot as compared with base line, and that of the building slip at 9/16 inch per foot as compared with the base line. The keel of each vessel is set parallel with the slope of slip and at 48 inches above that line.

Increasing the slope of the launching ways served a dual purpose:

(a) It gave sufficient declivity to overcome the high starting coefficient of friction resulting

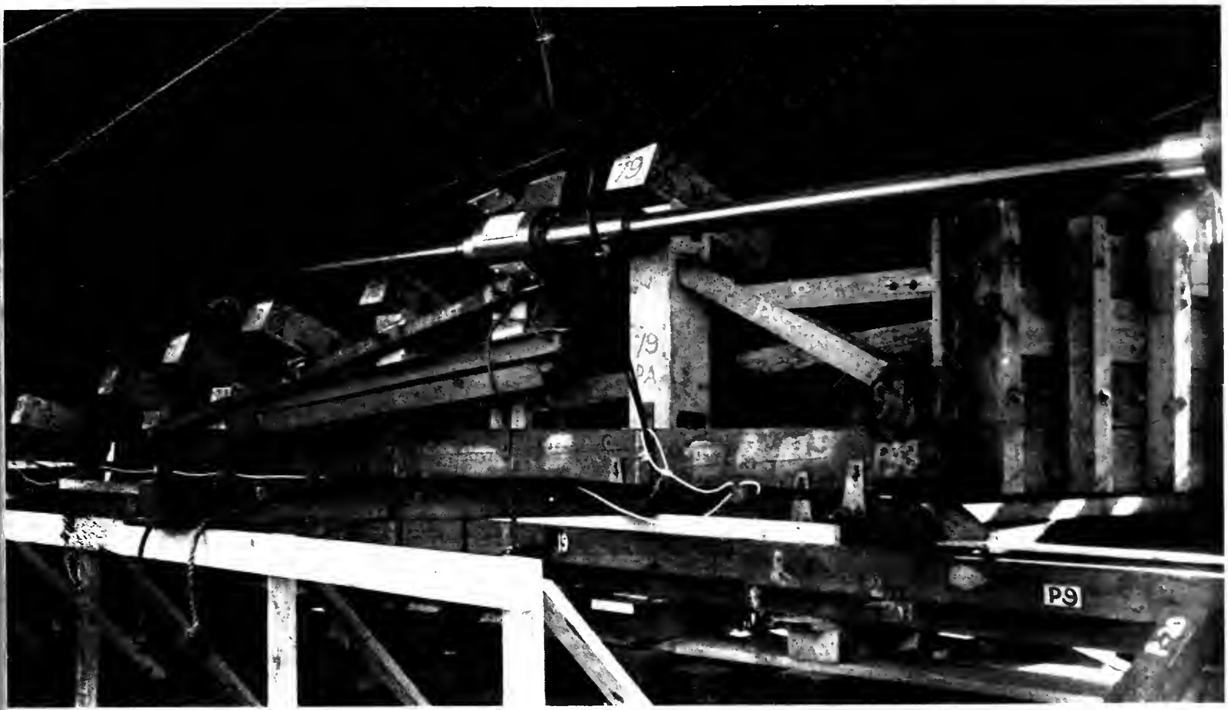


Fig. 2: Showing the 50-square-foot mask mounted on the after end of the launching cradle.

Fig. 3: Showing the effect of the mask.

from a relatively low pressure per square foot on the grease which was used to minimize possible damage to the base coat during the launching of the lower hull; and

(b) It permitted the upper vessel to be launched at a lower tide level than the lower hull on the ways. This resulted from the difference in declivity between the ground ways and the building ways which dropped the vessel closer to the slip by 1/16 of an inch per foot of longitudinal travel. The upper vessel, having a greater travel, reached the end of the ways at a lower elevation than did the lower ship.

Launching Grease

During the period between launchings, several changes had to be made in order to clear the ways for the passage of the upper ship. In order to coordinate these activities, a carefully planned launching schedule was executed. The jack log for the lower ship had to be removed, new base and slip coats laid in way of the jack log, the bolster on the groundways for the dogshore had to be removed, and the launching platform moved with

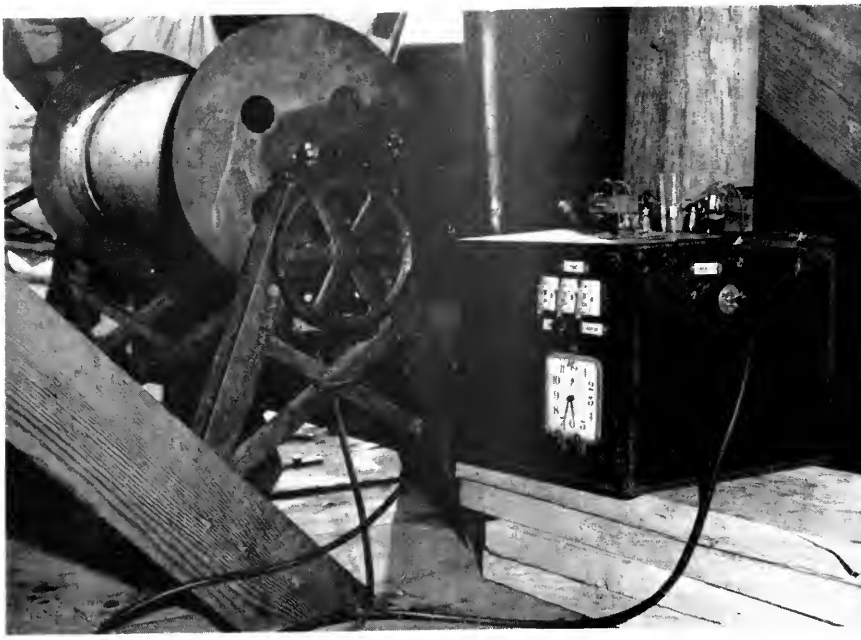


Fig. 4: Recording tachometer (launchometer) and reel mounted below launching platform.

a whirley crane to the upper position. During the course of the launching of the lower ship, all the slipcoat had been extruded and had to be replaced. Although, in general, there had been adequate time available, it was of course very important that the ways be cleared entirely and checked thoroughly prior to the launching of the second, or upper, vessel.

The upper vessel on the building ways has a 450-foot run before reaching the pivoting point or, in general, the point of maximum velocity. This extremely long run permitted the ship to attain a comparatively high speed, which was considered undesirable because of a tendency for the stern to plane, and because of a restricted channel at the end of the ways. Of the six vessels launched from the upper position, the maximum velocities have ranged from twelve to sixteen miles per hour, depending on the temperature on the day of the launching. Since the available channel area allowed 1000 feet of safe run, it was apparent that some positive means of dissipating the large amount of energy was needed to slow down the water-borne vessel.

Slow-Down Methods

Several methods were considered: chain drags, a hydraulic friction brake, sea anchors, a mask, and several others. After consideration of all types of checking arrangements, it was decided to use the mask, since it appeared to be the most positive checking device, because it was not subject to mechanical failure, and since it did not introduce any serious local shock conditions, as might other methods.

The calculation of the proper area for the mask was found to be very difficult, as previous launching acceleration data for this hull form were not available. After an extensive study and energy transfer analysis, the area of the mask was determined which would slow the vessel to the point where it could be picked up by tugs in midstream. The mask as finally installed measured 12′ 6″ wide and 4′ 0″ deep. (See Figs. 2 and 3.) The mask has functioned as anticipated, and the readings taken on the total distance traveled from the end of the ways show the travel ranging from 450 to 550 feet.

The vessels were to be launched on the same high tide, and a study of the tide curve and the launching characteristics curve revealed a maximum allowable time between launchings of two hours. In view of this, it was essential that a base coat launching grease be selected which had the tenacity to withstand the launching of the first or lower vessel and still adhere firmly to the groundways for the launching of the second or upper ship without being replaced. Numerous tests were made at the University of Washington, and a commercial base coat was finally selected which possessed a high melting point, good adhesive qualities, and an optimum balance of pliability and compressive strength.

Data for Slowing Down

In view of the difficulties encountered in the calculation of the required mask area because of the lack of empirical data, and in order to secure information for future calculations as regards water resistance and grease friction, careful observations were taken at several of the launchings to obtain the velocity and acceleration curves. These observations were taken using a reel approximately eleven inches in diameter and two feet long carefully wound with 1000 feet of 1/16-inch-diameter seizing wire, the end of which was connected to the ship. A counter mounted on the end of the reel shaft closed an electrical contact at the end of every fourth revolution of the reel. This, in turn, was connected with specially built recording tachometer, which gave a permanent record of the number of reel revolutions against time. (See Fig. 4.) By integrating the resultant time versus distance curve, accurate velocity, acceleration, and ultimately coefficient of friction curves were obtained.

The unique launching arrangement of two vessels laid in tandem has presented many interesting problems and has led to a detailed study of many factors ordinarily not considered. Twelve vessels have been satisfactorily launched in this manner, and several more are contemplated.

Some Notes on New Fishboat Styles

By K. M. WALKER, Marine Surveyor

ew Steel Tuna Boat

The first post-war all-steel tuna at is fast taking shape at the Crofn Diesel Engine Company at San ego. This 54-foot all-electric-weld boat is variously described as radi-, unusual and novel. The design oids all complicated forming of ell plates and frames and reveals e vessel to be of the "V" bottom pe with all straight frame sections. ck beams are also straight, resultg in a dead flat deck. The bow is abroad practically true half circle ulting in much room on deck at e forward end for stowage of ound tackle. The stern is a wide, t transom, which also aids in proling an unusually roomy deck ace.

This boat will have a beam of 18′ 6 and a molded depth of 9′ 0″, and ll stow about 50 tons of fish in ne. Propelling power will be two 10-hp Gray Marine diesel engines.

Loft work has been held to a minim, as the four transverse bulkads were set up and wooden rib nds sprung around the bulkheads d all frames lined up to the rib nds. All templates are taken right the job, thus avoiding all floor rk. This follows the Crofton idea o avoiding all unnecessary forming d shaping to keep the labor inved to an absolute minimum. hile the axiom is, "Avoid a curve en a straight line will do as well," vessel is not "Boxy" in appeare and presents a fair sheer line, nded bow and a good sweep to knuckle, or chine, line as well as nicely curved forefoot. Also the dual change in the angle of the mes toward the bow creates an ilion of flare.

This is the forerunner of a series o such boats to be built and comted one after another, and, conuently, a lot of experimenting and kering is being done on the first sel to develop short-cuts and easier ans of assembling. Exhaustive ining experiments and tests are to made to determine as exactly as possible the initial stability and the effect of various methods of loading. The net results of all these experiments will be applied in the construction of following vessels.

Fishing Vessels May Use Radio

Captain W. F. Towle, 11th Naval District Coast Guard officer, has advised vessel owners operating off the West Mexican and Central American Coasts that they may use their radio equipment while operating on the fishing banks, provided that no code of any kind is used and that all messages are in plain English. This will be of particular value in rendering assistance to any vessel in difficulty, as the actual location of the boat and the particulars of her trouble may be ascertained.

Another ruling of value permits fishing craft to enter harbor at night during the albacore and skipjack season when in convoy with a Navy patrol boat escort. A lot of valuable time can be saved through this ruling.

Swordfish and Albacore

The first swordfish of the season were landed at San Diego on July 14. The boat Ernie Jo came in with two broadbill weighing 345 pounds and 211 pounds. The Mary E. Silva came in with two marlin weighing 357 pounds and 235 pounds. All four fish were caught in an area off the Lower California Coast 35 miles southwest of Point Loma. Approximately 20 boats are now operating in this trade out of San Diego.

The first of the albacore, the feverishly-awaited big-money fish, were brought into San Diego on July 3 and totaled 900 pounds. The reports are that the fish are plentiful but are not taking the jigs, apparently due to cold water. At present writing, some good catches are coming in, with the result that about everything that will float is being fitted up with a couple of jig poles and heading for the open sea. It is reported that the only reason they are not using old bath tubs with outboard motors is that the demand for such tubs in the housing projects is too great.

To aid the small boat fisherman, the Van Camp Sea Food Company, the Westgate Sea Products Company and the Sun Harbor Packing Company, are anchoring buying barges off Point Loma to make cash purchases and save the fishing time usually lost when the boats have to enter the bay and unload at the canneries. The unloading barges have living quarters on board and will be moored in the lee of Point Loma throughout the season.

A typical pre-war California tuna clipper.

Pacific WORLD TRADE

By T. Douglas MacMullen

Foreign Trade Zones

There should be foreign trade zones on the Pacific Coast. Certainly there should be one, probably two and possibly three or four. In fact, every city that is concerned with the importation of products capable of being sampled, processed or assembled will probably have foreign trade zone privileges eventually. Interior cities may have them through airline connections, or even when the only way of reaching them is by surface means. In fact, it is not unlikely, nor unreasonable, that every bonded warehouse will be in a position to service certain types of imports. But there should be one or more zones in Pacific Coast port cities right now, or immediately upon resumption of volume commercial shipping.

The Port authorities, the import and export fraternity, the steamship companies, the warehouses, and the general public have a very real interest in free zone functions, but their respective interests are at variance with each other. A symposium on foreign trade zones follows:

By Thos. E. Lyons

In 1934 Congress took a forward step to encourage construction of efficient ocean terminals at our ports when it enacted the Foreign-Trade Zones Law, designed to encourage and promote our foreign commerce. The Act sets out the essential requisites for a modern ocean freight terminal, including shipside warehouses and connections with adequate inland transportation facilities. In return for providing these facilities and operating them as a public utility, the operator of the zone, which may be either a public or private corporation, is granted special privileges for handling foreign merchandise not intended or not ready to enter customs territory.

Thomas E. Lyons, executive secretary, Foreign Trade Zones Board, U. S. Department of Commerce.

The following list sets out many of the advantages and economies which the foreign-trade zone offers to importers:

(1) There is no expense for bonds or customs inspectors when imports are stored or manipulated, whether dutiable or non-dutiable.

(2) Buyers may examine and samples of merchandise may be withdrawn at any time.

(3) Imports may remain in storage with no time limit.

(4) Substandard foreign products are reconditioned before customs appraisal and liquidation. Goods not meeting standards of Government inspection agencies may be destroyed or re-exported.

(5) Ships, lighters, railroads, motor trucks, or parcel post make direct delivery to or from zone, insuring efficient and frequent carrier service.

(6) Foreign products may be held on consignment for spot delivery without being subject to customs regulations.

(7) Domestic products may be assembled, repacked, or combined with foreign products for export. Drawback formalities are unnecessary.

(8) Imports arriving improperly marked are remarked to meet customs requirements, and heavy penalties are thus avoided.

(9) Imports under "quota" restrictions may be received in any quantity in excess of quota and held without customs liquidation awaiting next quota period, thereby enabling owners to obtain loans on warehouse receipts.

(10) Alcoholic beverages and other liquids imported in bulk may be bottled, labeled and packed prior to customs entry and without being subject to State or Federal licensing agencies.

(11) Inland importers may arrange to examine foreign merchandise here and save costly transportation expense to interior points on defective merchandise that would be later returned. Examination prior to customs entry precludes the possibility of payment of duties on damaged or unsalable merchandise.

(12) Importers may erect their own structures within the zone to perform manipulating operations adapted to their needs.

In concluding, may I remind you that our ports are vestibules to world trade. The traffic which flows through them directly affects the economy of every part of the nation. It is your responsibility to see that these harbors are kept open and that they are provided with every essential facility which will expedite commerce and promote our merchant marine. Foreign-Trade Zones, if established in our gateway ports, will provide a type of integrated terminal service which will not only attract new traffic to the port itself but will also tend to increase commerce and coastal shipping in adjacent ports.

By J. F. Marias

Former President, State Board of Harbor Commissioners

Let's talk about a Foreign Trade Zone, or Free Port for San Francisco, or for that matter let's just talk about a Foreign Trade Zone for any place on the Pacific Coast.

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Briefly a Foreign Trade Zone is an area into which foreign merchandise may come and go without being subject to customs duties. It is not a newfangled idea. It has been a successful European operation for many years. It can be successful here. Then why has it not been established on the Pacific Coast long before now, especially since it has been successful in New York City?

Here are my answers and my position. It has not been established on the Pacific Coast because the Foreign Trade Zone Board, consisting of representatives of the War, Commerce and Treasury Departments, refused to grant the permission requested a number of years ago by the application submitted by the Board of State Harbor Commissioners. The Harbor Board spent about $7500 in making the survey and offered Pier 45 as the site. The Foreign Trade Zone Board did not think Pier 45 suitable, although since that time this same Board has granted permission to use certain piers in New York which, in my opinion, and I have studied the New York Zone a number of times, are not nearly as well suited as Pier 45. However, this does not mean that I approve of Pier 45, because I do not. It might be the best available, but that is not good enough. What must be made available is an area. It does not have to be docks or piers. The ideal area would be one very close to the industrial section of the city that would comprise waterfrontage, covered warehouses, open area, spur tracks, etc. In other words, a real terminal, not merely a dock.

There has been a feeling that if a dock or a series of piers is used that ships will deliver their consignments directly to such places. That idea should be discounted. It is poor operation to move ships from one dock to another. A ship, to operate economically, which it must do, must discharge its entire consignment at one pier only. One must not expect any one ship to bring in enough of any one or two items to make it interesting to a steamship company to make a special move to the docks of the Foreign Trade Zone. If the business of the Foreign Trade Zone were sufficiently large to bring in good-sized amounts, then, it seems to me, many berths would have to be provided. There must be a mathematical relationship of the number of ship berths to the area of the warehouses and open storage. This then means a terminal area such as I have described.

J. F. Marias, Sunset Produce Co., former president State Board of Harbor Commissioners.

If the Foreign Trade Zone business is not sufficient to cause ships to make direct discharges onto the docks of the area, then the goods must be trucked from the unloading docks to the Foreign Trade Zone. It seems reasonable therefore to deduce that if goods may be trucked or barged from one pier to another, permission should be granted to truck from the unloading pier to the area of the Foreign Trade Zone, regardless of where located. If this is reasonable, and it seems so to me, then it is also reasonable to permit warehouses, public and private, to be designated as official subdivisions of the Foreign Trade Zone. This is not asking too much, because today, under the emergency, the New York Foreign Trade Zone is divided into three parts and separated by many miles.

I believe in doing everything possible to reduce red tape and its attendant expense. As an economic basis, this country of ours is striving for economic distribution. There is no sense in reducing the cost of an article if we lose the production advantage in extra handling charges. This means, in my opinion, that the present law must be greatly changed. It must be more elastic and therefore more flexible. It must permit a greater number of operations, including manufacturing in transit, to give to our present manufacturing plants and public warehouses advantages they do not now enjoy. It is my opinion that the law is not better than it was originally intended to be by its authors, because there was a great deal of ignorance about its intentions and not sufficient interest in its advantages to command the discussion among all the people who should have been interested.

I have been interested in the Foreign Trade Zone idea for many years, and have made studies of these zones in several foreign countries. As the president of the Board of State Harbor Commissioners of San Francisco, I did not encourage a foreign trade zone for San Francisco because I did not, and I still do not, like the present law. It is not good enough for us on the Pacific Coast and it should be changed to our advantage, and when I say our advantage, I mean to the advantage of our present shipping companies, warehouse companies, manufacturing companies and our importers and exporters. And all of the advantages must be for us and not for the foreign competitor who might take advantage of certain conditions and actually take some of our business away from us.

One final word on the subject. The whole story should be thoroughly discussed with all concerned. It is not sufficient merely to expect the Harbor Board to provide space. And, while I am on that subject, if the Harbor Board should provide the area, it must be prepared to do considerable "promoting," because it must not expect a return for the use of the property for some time, and even at best probably not a full and proper return. I would suggest that the Harbor Board, in conjunction with the Chamber of Commerce and other associations, such as the Warehousemen's Association, the Manufacturers Association, etc., get together and make a thorough study. I think the result will be that they will recommend to Congress that the law be greatly modified in favor of a much more businesslike plan.

Others

J. Wesley Howell, general man-

(Page 89, please)

Pacific WORLD TRADE

Brazil—Where Something New In Trading Technique Has Been Developed

A good neighbor worthy of the name is the republic of the United States of Brazil, whose national birthday will be celebrated September 7.

Brazil is a country larger than the United States but with less than one-third the population. From its earliest history until near the close of the last century there was very little industrial development of any kind, but from about 1890 to the 1930's certain light industrial activities came into being. With the advent of the present National Government, however, heavy industrialization was encouraged, on the theory that the country was rich in natural resources and that by developing them through advanced methods a degree of national wealth could be reached to which the simple agricultural activities would never rise.

A prosperous country—like a prosperous family or a prosperous community—is a customer for many more things than a poor one, and it is with Brazil as a customer and Brazil as an exporter to us that we are here concerned.

The commercial aspects of our relations with Brazil are represented in this territory by the able and popular A. de Saboia, Consul-General at San Francisco. That the industrialization program of the Brazilian Government will result in increased trade between his country and ours is the firm conviction of Mr. Saboia.

A. de Saboia, Consul-General of Brazil at San Francisco.

Although by far the largest country in either North or South America, Brazil has never engaged in a war of conquest, and in neither the attainment of its independence from Portugal nor the establishment of a republic was there any loss of life. All boundary disputes have been settled by arbitration.

Brazil has a coastline of 4000 miles, and its major river, the Amazon, which is 180 miles wide at the mouth, is navigable by transatlantic steamers for a distance of 1000 miles. Comparable with the largest cities in the world are Rio de Janeiro and Sao Paulo, with populations of 1,700,000 and 1,300,000 respectively. Each city has a U. S. Chamber of Commerce.

It is said that the soil of Brazil and other indispensable factors could support a larger population than any other country in the world—at least 900,000,000. It is second only to the United States in cattle raising, maintains 55 railways, 142,000 miles of roads and has 37,000 miles of navigable rivers. As in Texas, things come big in Brazil. For instance, there are 106 islands inside the harbor of Rio.

The fact that the populated areas of Brazil lie south of the equator gives the country seasonal conditions that are the reverse of ours, so that there are many products that may be interchanged during the off-season in the home markets. Brazilians like our country, our ways and our products, and will always provide a market for such major commodities as automobiles, machinery, household equipment and utensils, railroad equipment, moving picture films, scientific instruments and many other items. Even under industrialization, Brazilian production is roughly distributed as follows:

Food	40.2%
Textiles	27.6%
Clothing and toilet articles	8.2%
Chemicals and allied products	7.9%
Other industrial groups	16.1%

Many articles of U. S. manufacture require one or more products from Brazil. These include such more or less important catagories as electrical devices, paints and varnishes, phonograph records, golf balls, the contents of the coffee pot—and lip stick. Place names in Brazil are also more or less familiar. There are four places named Philadelphia, six named New York, 28 named California, one named Washington, and one Brooklyn. Brazil also has a place with just about the shortest possible name—the town of O, located near Sao Paulo.

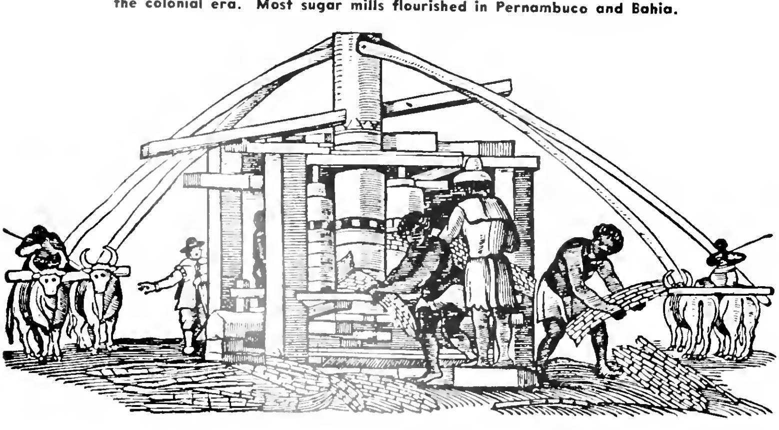
Something New in Economics

Not heretofore thought of in connection with the economics of any country, as far as we know, is the new excess profits tax law in Brazil and its direct effect on International Trade. Unlike our excess profits tax laws, this tax is really accumulation for the future. Here is how it works:

The amount of profit a corporation may earn before reaching the "excess" category is computed in a definitely foreseeable manner. They first take the average profit earned in two consecutive years from 1936 to 1940, plus 50%, and add to this an amount

SUGAR MILL

This reproduction of an old Dutch print shows the primitive industry of Brazil during the colonial era. Most sugar mills flourished in Pernambuco and Bahia.



Pacific WORLD TRADE

representing 25% of new investment in the business since 1941. Or there is a certain alternative plan. In no case is a profit that totals less than 100,000 cruzeiros (about $5000) subject to the tax. The tax is 20% of the above computed profits, with a rising tax scale of 30, 40 and 50% as the profit reaches 300%.

Here is where the tax differs from any excess profits tax that we know of: The tax shall not be paid if the company invests twice the amount of the tax in what are known as Equipment Certificates. The money invested in Equipment Certificates earns an interest rate of 3% for the taxpayer, and the certificates may be used practically as cash for the purchase of machinery and implements abroad for re-equipping or expanding the facilities of the company. During periods of import restrictions, import priorities will be granted to holders of Equipment Certificates. Thus a firm is really setting aside its excess profits for the importation of plant improvements at such time as the materials are available. In case of emergency, the money may be withdrawn on payment of the tax.

Mr. Saboia tells us of various new industrial developments in Brazil, particularly the steel industry. Brazil has been importing its heavy structural steel and railroad rails from Belgium and Germany. She intends to make her own, hereafter, from Brazilian ore. There will be no effect on the American export of high-grade steel for machinery, tools, etc., which will continue to be imported from here. The development of the Brazilian steel industry, however, is one step in the industrialization of the country and its program for creating wealth to augment its export income from coffee, hardwoods, chemicals, cacao and other items that have built up Brazil's present large exchange balance.

We have in the past let European countries out-pace us in Brazil—and in other countries too—by an unwillingness to open up and make investments in merchandise displays, warehouse stocks, and sales representation

A typical residence in a modern section of any large city in Brazil.

in which we have confidence. The tendency has been to sell from catalogs—catalogs that were probably printed in English, or worse yet, in Spanish—and offered by whirlwind salesmen unfamiliar with either the goods or the country, or possibly—probably—by mail.

We have depended on our money to work for us, and to work in too devious a manner. Mr. Manufacturer writes a check to his stockbroker on some glowing foreign bond flotation and hopes to get five, six, or ten per cent. A year or so later he really gets—you know what. Why not write a group of checks for a sales survey, for good engineers, good sales representation, a stock of the right products, and a little check to the steamship company. If every step has been rightly taken, he will have something solid for the future of his business: a new market—Brazil.

The Consul-General will be the guest speaker at the San Francisco Foreign Trade Association on the occasion of Brazil's national birthday, on September 7.

World Market for U. S. Gold Urged

Benefits from the world demand for gold at prices greatly in excess of $35 an ounce should be available to American miners, according to a resolution just adopted by the directors of the San Francisco Chamber of Commerce.

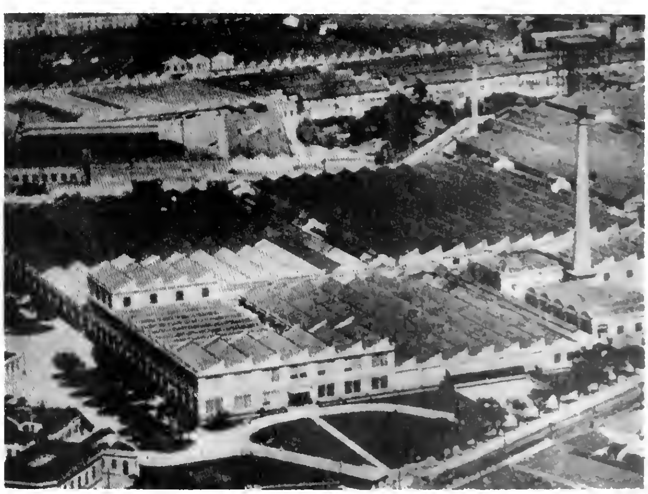
After noting that a market for gold bullion exists in India and North Africa, for instance, at prices in excess of the legal price in the United States, and that the American Government is supporting armed forces for the defense of countries where there is a great demand for gold, their resolution proposes procedure by the President and the State Department whereby both the American Government and domestic producers could obtain the benefits of the high gold prices.

Three-way benefits are at present being prevented by legalistic restrictions which could readily be cleared away in Washington and London: Gold producers—and the country as a whole—would gain from gold production; our military establishments on certain fronts could be supported from the enhanced valuation of gold; and the countries involved would gain the use of an added gold supply, a sure medium of exchange.

Support of the Chamber's position is being sought from all of the congressmen of the Western States as well as various organizations concerned with the domestic mining industry.

Wartime conditions have brought many problems to American gold producers, and it is believed that participation in the present world market for gold will help them defray excessive current costs and to be prepared to afford important employment in the post-war period.

Industrial Sao Paulo today.



Pacific WORLD TRADE

Steamship Companies' Position on Air Service

Most peculiar is the position in which the steamship companies find themselves in their efforts to provide air service to their patrons—efforts which not only competitive interests but even our Government seem bent on obstructing.

More than once have ships played a vital part in the history of civilization. From Solomon through the days of the Phoenicians, Greeks and Romans, the Norsemen, Columbus, Brittania's rule of the waves, the American clippers, the A. E. F., to the convoys of World War II. When Noah built his Ark and carried his cargo to safety, a pace was set that ship operators have been maintaining ever since.

There have been rocks and reefs along the way, but the operators have survived to support their country's welfare and their country's commerce yet again. From Ark to galleon to clipper; from Savannah to Matsonia, there has been progress in water transportation which it is hoped the shipping industry will never permit to lag.

Comes now the era of overseas air traffic, in which many steamship lines are concerned, and in which some have pioneered, but which newer air companies would usurp to the exclusion of surface operators, who have over the years sought by every possible means to improve, through every new device, their service to the public and their country's markets. Completley overlooked by most of the public is the early cooperative efforts of such surface lines as Grace, American Export Lines, Matson Navigation Company and others. It was Matson, for instance, who largely made the early Air Clipper operations possible by subscribing $500,000 to Pan American Airways, under a contract by which Matson was ultimately to operate the mainland to Hawaii part of the service. The Government has disapproved the plan, however, and Matson is disposing of its investment. Matson had other air interests in the Inter-Island Steam-

Almon E. Roth, president National Federation American Shipping, who heads up the industry's air plans.

Frazer Bailey, executive vice president Matson Navigation Co., whose charted program is mentioned herein.

Navigation Company running back 14 years. These interests have also been disposed of. Matson does, however, convert and ferry the Navy planes to the Islands, but this activity, by its very nature, will not be permanent.

Such are the efforts of one major steamship company to engage in air service, and they bring us down to its application for a certificate of public convenience and necessity for operations between Hawaii and San Francisco, Los Angeles, Portland and Seattle, which application has been pending since September, 1943. Many other steamship companies have filed applications, or intend to file, and such applications will be considered separately by the Civil Aeronautics Board. It is generally thought that the following have plans under way:

American Export Lines
American President Lines
Atlantic, Gulf and West Indies Steamship Lines
The Grace Line
Matson Navigation Company
Moore-McCormack Lines
United Fruit Company
United States Lines
Waterman Steamship Lines

At all events, these companies have joined in the proceedings before the House of Representatives Committee on Merchant Marine and Fisheries in an effort to obtain, by legislation, clarification of the present Civil Aeronautics Act.

The Argument

It is suggested that American shipping should have the privilege of using airplanes in conjunction with surface craft over its established routes because:

(A) It is familiar with the sources of trade in overseas areas and in the United States;

It has established organizations both local and overseas; it is familiar with customs and other regulations; and it can generally utilize much of its existing organization to give efficient and economical service.

(B) It has pioneered these overseas routes to many ports of the world, the growth of which has been substantially due to its efforts and improvements in service, including the use of the most modern equipment, of which the airplane constitutes the next logical step.

(C) American shipping is completely engaged at the present time in the war effort, while other forms of transportation have done and continue to do a substantial commercial business, some of them more than in normal times. When peace comes, American ships will be required for at lease a year for the repatriation of American troops, and at least another six months for reconditioning and reconverting. It would be manifestly and grossly unfair to turn over their normal business to a relative newcomer in the field simply because the newcomer began service at a later date with a type of equipment which was not available when the surface lines established their services.

(D) Foreign lines are planning utilization of planes and ships in combination. The American Maritime

Industry must be placed in a competitive position. To deny such privilege to American companies would be to place them at a serious competitive disadvantage, perhaps to the exclusion of American flag service over certain routes.

The following are the principal arguments advanced by the opposition:

(1) That shipping companies in utilizing planes would not seek to develop aviation service over their routes to the maximum of public benefit, but would use the aviation portion of their services to restrain aviation development in order to protect their investment in surface craft operation.

Answer: Aviation services in whole or in part can only operate under certificates issued by the Civil Aeronautics Board. The Board will have full power of regulation, including the right to revoke certificates if improperly used. Under these conditions it would be impossible to develop and operate such air services in other than the public interest, even were this the object of the shipping companies, which they stoutly deny.

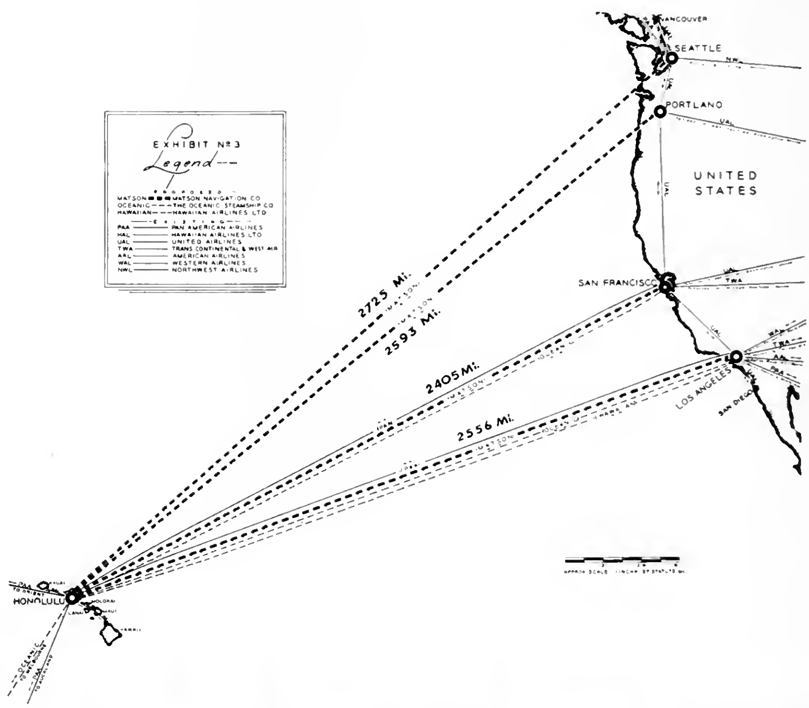
(2) The opposition points to the old Panama Canal Act and the Motor Carriers Act as evidence of the policy of this country, for many years, to segregate transportation and to develop each type in an entirely separate manner.

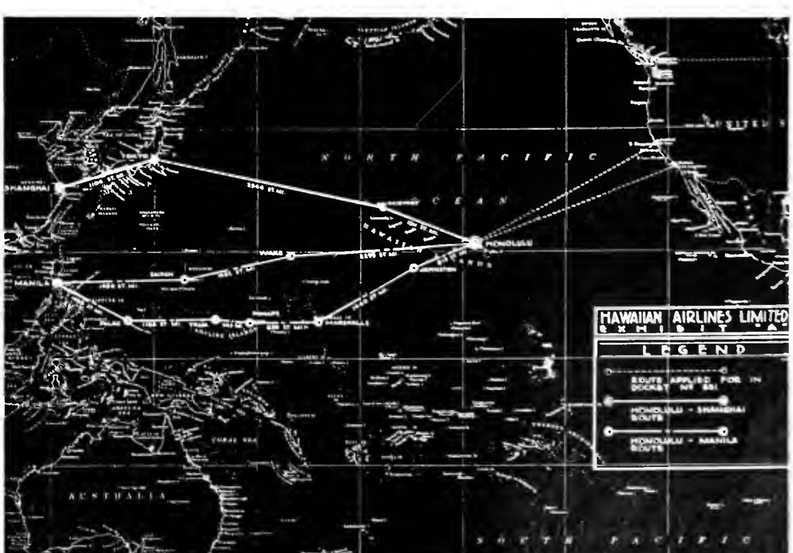
Answer: The theory and the effect of the old Panama Canal Act (1915) related entirely to competition within the United States. It could not have had any influence on foreign or overseas competitive conditions. At the time the Panama Canal Act was passed, water lines were much more free of Government regulations than is the case today. Since both the Panama Canal Act and the Motor Carriers Act (1935) were enacted, Congress passed the Merchant Marine Act of 1936, directing the Maritime Commission to study all phases of cooperative aviation and steamship operation and to make appropriate recommendations to Congress.

It would therefore appear that the latest declarations of policy by Congress clearly contemplate the cooperative rather than the separate operation of air and surface forms of overseas transportation.

(3) That "integrated services" as suggested by the steamship companies does not mean the cooperative use of planes and ships by an individual company, but in reality means, in the ultimate, only one combined transportation system of all forms, under which independent steamship companies and independent air companies seeking to serve the same route would not be permitted (or if permitted, would not be able) to operate economically. The result would be a single transportation cartel tending toward Government control and ultimate socialism.

Answer: Nothing is further from the proposal of the shipping companies. In their view, the post-war operation of an overseas transporta-





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on system would embrace all the lements and modern equipment vhich can be utilized in the public ervice under Government regula- on. Further, in asking the privilege f using planes, steamship companies ave not in any manner suggested a iminuation of the number of certifi- ates for air services which may be ranted to strictly air companies.

(4) The opposition has implied, if has not charged, that the shipping ndustry's suggestion would amount o a monopoly of overseas transpor- ation.

Answer: The use of planes in con- unction with ships by steamship ompanies over their routes, in com- etition with as many air services by trictly air companies as the Civil Aeronautics Board cares to grant per- nits to, is the farthest thing from nonopoly. And it should be noted hat in the foreign overseas services t can be safely assumed that ample ompetition will be provided by for- ign air lines and by foreign steam- hip lines who have already an- nounced their intention of combining planes with their shipping services.

(5) That in order to obtain the necessary capital from the investing public, the aviation industry must be free from potential competition such as might result from the participation of surface carriers in aviation devel- opment.

Answer: Few industries have ever had the public appeal and interest that is at present the case with avia- tion. Public investment follows pub- lic appeal. Public interest in aviation is such that capital will flow to it in ample quantity irrespective of surface carrier participation in its develop- ment. Further, to limit competition, which infers larger profits, in order to stimulate investment, would not seem to be sound national policy.

The steamship companies have made their program for air develop- ment a major project of the National Federation of American Shipping, of which Almon E. Roth is the presi- dent. This is in order that the effort my be a unified one, rather than one of scattering their shot in various and duplicated directions.

The individual applications are well prepared and are being presented with sound supporting evidence, giv- ing a complete outline of routes, pas- senger and freight rates, type of equipment, terminal facilities and cost of operations. In operating over their present steamer routes, they will be able to provide their own meteorological data and generally will have their planes in communica- tion with their steamers at all times. They are already equipped with com- mercial facilities at terminal and in- termediate points, and will be ready to start operations upon delivery of equipment, assuming, of course, the granting of these certificates.

Above: Midway — freight being taken off Clipper.

Right: Passengers boarding the American Clipper at Auckland.

Peace Shipping to Be Studied by Harvard

Under an appropriation of $85,- 000, a non-partisan survey into the future of the merchant marine has been contracted for through joint ac- tion of the U. S. Maritime Commis- sion and the Navy Department. The Harvard Business School will under- take the survey, which was originally suggested by Congressman S. O. Bland, chairman of the House Mer- chant Marine and Fisheries Commit- tee. The main purpose in having such a group make this survey is to keep the results completely free of any influence which a Government or industry group studying this subject might exert. Maritime officials said the study does not overlap that of the agency's planning committee, which for months has been investi- gating all phases of ship needs and operations. Emphasis in the compre- hensive survey will be placed on the facts necessary for the development of a program for maintenance of post-war shipbuilding capacity and the post-war shipping industry, and on recommendations on which to base such a program.

Pacific WORLD TRADE

Foreign Trade Zones

(Continued from page 83)

ager of the Haslett Warehouse Co., and president of the American Warehousemen's Association, points out that every bonded warehouse now has most of the functions of a foreign trade zone and by slight legislative changes would be able to offer practically all of the features desired. He calls attention to the differences between such zones in European cities and those advocated for American ports. European countries are small and the commercial relations between them much more common and necessary than between American cities and foreign shippers. Hamburg, for instance, is a center for distribution to all of Northern Europe and especially to the Scandinavian countries. Importations are processed and manufactured and reshipped in tremendous volume, while in New York most importations would have come thousands of miles for processing and be reshipped thousands of miles to consumers. The same would be true of New Orleans, San Francisco, Los Angeles, Seattle or Portland. He adds that New York's Trade Zone, the only one at present in this country, waited many years before becoming a commercial success, and that even now much of its volume is regular commercial warehouse business. But Mr. Howell advocates the earliest possible establishment of a zone in San Francisco, even though it be on a very small scale, thus enabling the project to prove its worth.

G. A. Gumbrecht, chairman of the Foreign Trade Zone Committee, S. F. Chamber of Commerce, emphasizes that a foreign trade zone would give San Francisco an address such as "San Francisco Foreign Trade Zone," to which foreign goods could be consigned. The Chamber of Commerce takes the position that while "inland" warehouses,—that is, those that are away from the piers but still within the trading area,—might meet some of the requirements, the advantages of waterside locations are great enough to justify awaiting the release of the piers from war usage.

The steamship companies raise the question of the cost of moving a vessel from its regular pier to the free zone. Since port costs are a major part of general operating costs, it will be seen that any moving about in a harbor, involving added time in port, would very materially increase steamer operations and that such added costs would have to be made up in freight rates. Mr. Gumbrecht contends that an addition to established rates to cover such moving about could be readily obtained. All concerned do not agree on this point, as there are legislative as well as competitive elements involved, but since all costs of transportation must inevitably be absorbed by the goods shipped, if there are commercial advantages to the free zone idea, there should be a willingness on the part of those benefited to pay for them.

San Francisco Has Taken Lead

It was the San Francisco Chamber of Commerce that initiated Congressional legislation in 1917 to provide for foreign trade zone operations in United States ports. Since that time, warehouses have been granted privileges which they did nót have before, such as delayed custom administration, but there is undoubtedly a very worthwhile advantage to the entire business community and its supporting area which cannot be argued down nor legislated into existing organizations. That advantage is, as Mr. Gumbrecht and others point out, publicity, and it is worth a sizable expenditure to any city.

The mere announcement of the existence of such a zone would put its city on the world shipping map in a way that a beautiful harbor, elaborate piers and all of our famous products could never do. It is worth the concentrated enthusiasm and the fanciful contributions, if necessary, of every business organization, civic organization, labor organization and transportation facility of the community. These organizations exist in a port city because of the port's shipping, and the more shipping there is, the more worthwhile these organizations become. Even competitive warehouses will profit from a more prosperous port.

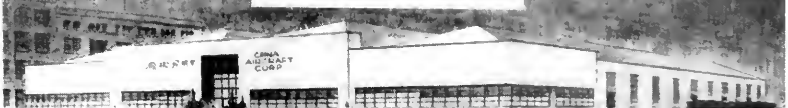
So-Called Opportunities for Young Men in Latin-America Should Be Scrutinized

James S. Carson, vice president of the American and Foreign Power Company, and active in the National Foreign Trade Council and the United States Chamber of Commerce, has recently published in the Pan-American Union Bulletin a warning that many young Americans tend to romanticize Latin-America and to exaggerate the opportunities there. Most positions in any country will be filled by citizens of that country. However, there will be opportunities for those with special qualifications. According to Mr. Carson, the essentials for one wishing to go into the Latin-American field are: a thorough knowledge of the business or pursuit to be followed; a speaking, reading and writing knowledge of Spanish or Portuguese (preferably both); understanding of the economic geography of the Southern countries; and at least an acquaintance with the background story of the history of Latin-America. We might add that the "siesta" and "manana" ideas are rapidly going out of style there.

A New Export Item

The factory of the China Aircraft Corporation, now nearing completion in San Francisco, is intended to produce certain parts for Douglas Attack Bombers, using 200 Chinese mechanics now in training at the Douglas plant. Eventually 3000 Chinese will be employed.

There are several objectives in this project. One is the aiding of the aircraft industry in producing warplanes, another is the employment of Chinese resident in the United States, of whom 40,000 live in the San Francisco Bay area. A third objective—and here is where foreign trade enters the picture—is the dismantling and shipping of the entire plant to China at the close of the war. This will be one means of setting up a new industry completely equipped with machinery, a production program, and an able corps of mechanics, in very short order. It is an idea that may spread to other industries and to other countries. It is understood that Mexico has some such plans, and there may be others.



Reading right to left: Complete photo China Aircraft Corp. under construction.

Shipbuilders Witness Launching

A second gold star is added to Marinship's Maritime "M" pennant on June 28 as the Sausalito yard's own "Betsy Ross" (Edwina Whaley) sews on the new award. Bill Barry, member of the Pre-Hull Outfitting Section, is at the halyards.

(All photos courtesy Marinship)

One of the most distinguished assemblages of American shipbuilders ever to witness a Pacific Coast launching turned out recently to see Marinship's 16,500-ton tanker S. S. Mission Loreto slide down the ways at the Sausalito, California, shipyard.

Headed by Rear Admiral Howard L. Vickery, vice chairman of the United States Maritime Commission, and the top executives of 12 of the nation's 38 leading shipyards, the visitors watched Mrs. S. D. Bechtel, wife of the chairman of the board of California Shipbuilding Corporation and president of W. A. Bechtel Co., send Marinship's 33d tanker down the ways. Miss Barbara Bechtel served as maid of honor.

In addition to Admiral Vickery, director of the country's merchant shipping program, those attending the launching included Carl W. Flesher, Western Regional Construction Director for the Maritime Commission; C. H. Johnson, Technical Assistant to Admiral Vickery; George Sharp, prominent naval architect; Henry J. Kaiser and Edgar F. Kaiser, representing the seven Kaiser shipyards at Richmond, Calif., Portland, Ore., and Providence, R. I.; Monro Lanier, president of Ingalls Shipbuilding Corp. of Pascagoula, Miss., and Decatur, Ala.; C. W. Bryan, Jr., vice president of Federal Shipbuilding and Dry Dock Company of Kearny and Port Newark, N. J.; and W. H. Gerhauser, president of Delta

Speaking from the boat deck of a large midship deckhouse assembly on one of the yard's pre-hull outfitting skids, Admiral Howard L. Vickery compliments swing shift workers for turning out quality ships. With him on his inspection tour was a distinguished group of American shipbuilders. Seated on the platform are: Lt. William Weber, aide to Admiral Vickery; J. W. Belanger, vice president and general manager of General Electric; W. H. Gerhauser, president of Delta Shipbuilding Company, Inc.; W. E. Waste, Marinship general manager; Rear Admiral Lee O. Colbert, Director of the U. S. Coast and Geodetic Survey; K. K. Bechtel, Marinship president; C. W. Bryan, Jr., vice president of Federal Shipbuilding and Dry Dock Company; (behind Admiral Vickery) C. H. Johnson, technical assistant to Admiral Vickery; George Sharp, noted naval architect; Munro Lanier, president of Ingalls Shipbuilding Corporation.

Shipbuilding Company, Inc., of New Orleans.

Also on the launching platform were S. D. Bechtel, chairman of the board of California Shipbuilding Corporation; and K. K. Bechtel, president of Marinship Corporation.

The U. S. Navy was represented by Vice Admiral John W. Greenslade, Coordinator of Naval Logistics for the Pacific Coast; Rear Admiral Lee O. Colbert, Director, Coast and Geodetic Survey; Rear Admiral H. F. Bruns, Superintending Civil Engineer, Area Six; and Capt. J. T. A. Alexander, Chief of Staff to Admiral Greenslade.

Three prominent suppliers of marine propulsion equipment were also on hand—Felix Kahn, vice president of the Joshua Hendy Iron Works; J. W. Belanger, manager, Federal Marine Department of General Electric; and R. M. Alvord, General Electric's Pacific Coast District manager.

Following the launching of the S. S. Mission Loreto, Admiral Vickery talked to Marinship's swing shift workers, and presented a second gold star for the yard's Maritime Commission "M" pennant for "continuing outstanding production achievment."

Admiral Vickery told workers that he was expecting an additional tanker above the number called for in schedules for the month of July, then complimented them on the quality of the 10,000-horsepower turbo electric tankers they are turning out. Referring to a recently delivered ship which he had inspected during the day, he said, "It can stand on its feet as an oil tanker anywhere, and I've seen tankers all over this world. You're doing a grand job. Keep it up!"

Top of page: Admiral Vickery tours the tanker yard in the company of Ray L. Hamilton, production manager, and Jack Hardie, general superintendent of ship construction. The admiral went through the yard's S. S. Mission Buenaventura, 10,000-hp T-2 tanker, which was delivered shortly after his inspection, and stated that, "It can stand on its feet as an oil tanker anywhere, and I've seen tankers all over this world."

Center: Under the expert eye of Admiral Vickery, Mrs. S. D. Bechtel smashes the champagne on the bow of the S.S. Mission Loreto at the June 28 launching ceremonies at Marinship. Shown are: Steve Bechtel, Jr., U.S.M.C.; Miss Barbara Bechtel, maid of honor; S. D. Bechtel, chairman of the board of Calship and a Marinship vice president; Admiral Vickery; and Mrs. Bechtel.

Bottom: The sponsor and maid of honor smile following the launching of the Mission Loreto. Left to right are: Capt. J. T. A. Alexander, Chief of Staff to Admiral Greenslade; Rear Admiral H. F. Bruns, Superintending Civil Engineer, Area Six; Vice Admiral John W. Greenslade, Coordinator of Naval Logistics for the Pacific Coast; Mrs. Bechtel; Miss Bechtel; Rear Admiral Vickery, Vice Chairman of the U. S. Maritime Commission; and Rear Admiral Colbert.

Bearings and Lubrication

II—LUBRICATION

By S. Kyropoulos*

The Various Kinds of Friction and Lubrication

There are fundamentally three kinds of friction: dry friction, boundary friction and fluid friction. The first is always associated with wear, the second practically always (probably due to the small margin of safety against producing dry friction), and the third is both theoretically and practically free from wear.

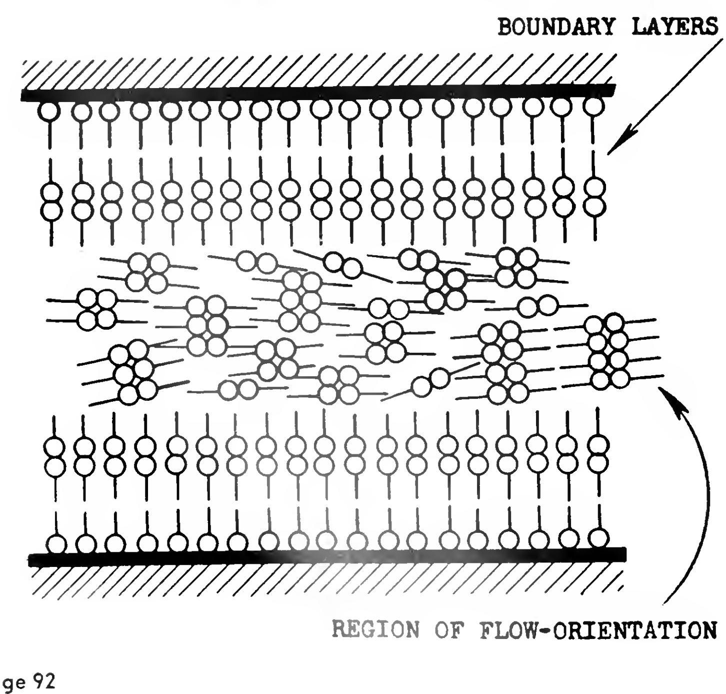
Dry friction is produced in brakes and clutches. The following example is an attempt to illustrate the two other kinds.

We imagine a small water channel of rectangular cross section, say 3 ft. long and 5 in. wide and deep, all made of glass. Clean glass is wetted by water. That means that at the walls or boundaries of the channel there will be always a stagnant, immobile "boundary layer" of water "adhering." Hence the speed of flow must be zero at the walls and highest in the middle, as we can readily demonstrate by throwing chips of paper on our stream.

Due to the same "boundary layer" we could as well produce a movement within the "free water" if we would stop the flow and moved one of the walls. This is precisely what happens in a bearing. By means of its boundary layer the shaft sets the oil in the bearing clearance in motion. This motion slows down as it approaches the opposite boundary layer of the bearing. This transfer of motion is due to the friction between the water (or oil) particles, called the "viscosity" of the liquid.

What we described were cases of fluid friction. The same, comparatively small friction or resistance we feel if we take two clean plane glass plates, one in each hand, and move them at a distance from each other, submerged in water. On bringing them, still submerged, in close contact by pressure, we feel considerably more resistance on trying to move them past each other. The experiments illustrate the lower fluid friction and the higher boundary friction, although we certainly had nothing to do with pure boundary friction. We speak of fluid friction when friction takes place between the smallest particles of the liquid in a film which is many times thicker than the smallest particles and, hence, of "thick film" or fluid lubrication. We speak of "boundary" friction or lubrication, "non-fluid," or—less accurately—"thin film" lubrication, when friction takes place between the boundary layers.

Fig. 8: Schematic representation of the lubricating layer in the operating bearing. Fatty acid as lubricant.



Boundary Lubrication

Non-fluid lubrication usually appears as a phenomenon mixed with fluid lubrication and has to be considered an unavoidable evil, for instance, in piston ring lubrication and whenever a shaft is started or stopped. The evil consists in the fact that no surface is mathematically smooth. Hence, at the "peaks" of the rubbing surfaces, pressures and temperatures rise so high when the oil film is "thin," that the oil evaporates or decomposes at such spots and welding occurs for an instant, or some similar destruction of one or both surfaces. Fatty (animal, vegetable) oils and certain other chemicals are sometimes added to mineral oil to reduce the hazards of thin film lubrication. Such oils are called "compounded" oils, sometimes "doped" oils.

The point is that the "dope" forms the boundary layer and usually has a lower boundary friction than the oil itself. The "dope," thus, tends to keep down the temperature—our greatest headache and troublemaker. It has still more functions. When it does "break down" (better, "decompose") at the surface peaks, it does exactly the reverse of what the mineral oil does: instead of cleaning the metal surface from oxide, as we do when we want to solder or weld two metals together, and as the decomposing mineral oil does, the "dope" oxidizes the surfaces and thus hinders welding. The same effect has

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been known for a long time with the so-called "extreme pressure" lubricants. All such chemicals should be rather called "extreme temperature" lubricants. As a matter of course, dopes will be the more useful, the severer the rubbing conditions and the greater the hazard of welding. Thus, in piston ring lubrication they are particularly useful, because in this case the rubbing alloys are very similar and easily welded.

The phenomena just described are often referred to as "oiliness," sometimes for the sake of brevity, mostly however out of ignorance. The use of that word was justified at the time it was, and as it was originally coined; it is no more so today.

"Oiliness, that ghostly quality, has come in for a considerable play; film strength, another manifestation from the occult, is in everybody's mouth," says one able engineer. We endorse that statement and discourage the use of such words, because very often vague words are used to cover ignorance and tangible blunders. Most of them do lend themselves to a far reaching analysis, provided one's knowledge of the subject reaches beyond shop gossip.

There is no all-purpose oil any more than there is an all-purpose bearing alloy and a "doped" oil is not by itself necessarily better than a straight one, because "doping" is (1) done for various purposes of which we mentioned only the lubricating aspect; (2) it has its disadvantages for certain uses. In marine lubrication compounded oils are mostly used for better emulsification with water, which is desirable in some uses.

In the language of physics and chemistry, we know pretty well how the "smallest particles" of oils, called "molecules," look. We also know that, in the liquid, groups of molecules cluster together in a regular manner. For simplicity let us consider a molecule of a chemically prepared dope or "additive" as the chemist calls it. It is substantially rod-shaped, the longer part of it being built up as an ordinary oil molecule. Let us call it the "tail." The opposite part "head" contains oxygen—hence its oxidizing capacity when it decomposes at high temperature. This head adheres more strongly to the metal than the tail. For that reason, in a doped oil, the oil molecules, which are only "tail" are soon displaced from a metal surface by the molecules of the dope.

This better adhesion can be easily demonstrated by an experiment. Take two reasonably well finished metal plates—tin plate will do—wash them with soap suds until they will be completely wetted by clear water and let them dry without touching them. Then pour on the one some pure mineral oil or kerosene, and on the other some cottonseed oil or other vegetable oil, or fish oil, preferably of similar "body," so you are not fooled by viscosity effects. Then try to rinse the samples under the water tap and watch how the sample with mineral oil becomes "wettable" much sooner. Or did you ever notice how hard it is to get rid of fish odor on plate on trying to use just water? The compound that smells (and the oil itself) are such "dopes."

Fig. 8 shows a picture of the lubricating layer between two metal surfaces, as it would look if we could magnify it millions of times. We omitted the mineral oil and left only the "fatty acid," the dope, signifying heads by circles and tails by lines.

The boundary layers may or may not be several molecules thick. Probably they "fade out" in some manner into the middle region where the liquid is flowing. Moreover we notice in that region also a tendency toward a regular, axial arrangement which at high speeds causes a certain decrease of the viscosity.

Fluid Lubrication

Fluid lubrication precludes wear. It is the one kind which the engineer (and, of course, the operator) has to try to obtain. Its theory is well developed and has been confirmed by thousands of experiments over and over again. It is not simple in its details but its fundamental principle is easy to understand and so are some of its complications and limitations. The basic means of obtaining fluid lubrication becomes almost obvious, at least in a general way, once the principle is demonstrated, although we cannot cover the matter completely. However, the intelligent design of a bearing is not a simple matter. The principles of fluid lubrication enter into it, as design factors. A knowledge of these principles permits us to service and lubricate a bearing intelligently. With this knowledge we may check the soundness of design and installation and, in cases of distress, learn from experience or help to find the reason. An operator who is somewhat familiar with these principles will avoid

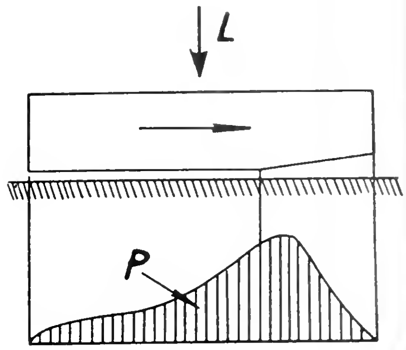


Fig. 9, above: Principle of fluid lubrication. Moving slipper forms wedge-shaped oil film and floats on it. L load, P pressure distribution in oil film in vertical direction.

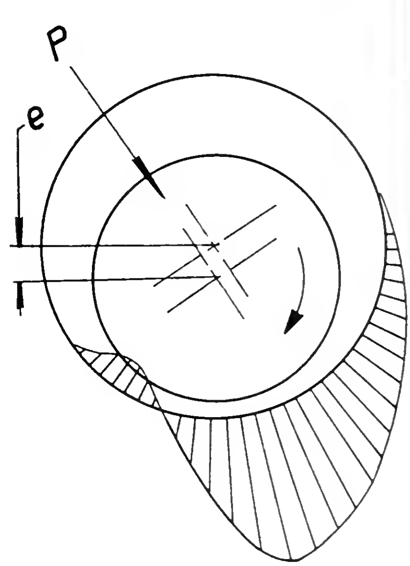
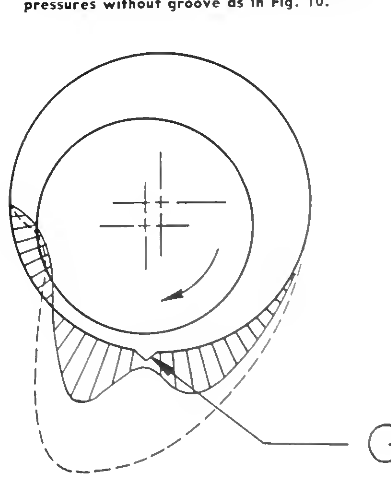


Fig. 10, above: Pressure distribution (shaded area) in wedge-shaped oil film of full plain bearing along its circumference. Outer circle: bearing; inner circle: shaft; P load, e eccentricity.

Fig. 11, below: Pressure distributioo (shaded area) in oil film of bearing containing axial oil groove G. Dotted curve indicates pressures without groove as in Fig. 10.



the worst mistakes in installation, will appreciate that there may be many factors involved in a failure, and will better know when to consult an expert.

The fundamental principle of fluid lubrication is illustrated by Fig. 9, a plane slipper sliding on a plane surface under load L. The empty space between the surfaces represents the oil film. The vertical lines in the area P show the pressures created in the oil film by the sliding motion of the slipper in the direction of its bevelled end. This end squeezes the oil under the slider, compresses it so that a pressure distribution is set up under the slider, in the oil film, as indicated. The pressure "profile," the shaded area of the figure, is wedge-shaped and the film itself assumes a wedge shape, higher where the pressure is high, and lifts the slider so that it floats on the oil without coming in contact with the other metal surface. Three factors contribute to that effect: the bevelled end of the slider (moved in the opposite direction it would act as a scraper), its speed, and the viscosity of the oil. Speed and viscosity must be so adjusted, that the oil cannot meanwhile entirely leak out sideways. Thus we get an idea of the basic principle of fluid lubrication and the three contributing factors: load, speed of motion and viscosity. Their very characteristic interconnection with the amount of friction (which is a measure of loss) is reserved for discussion at the end of the article.

Fig. 10 shows the application of the principle to a full bearing. The outer circle represents the bearing, the inner the shaft. For clarity, the clearance is enormously exaggerated. It is supposed to be filled with oil. The load P is vertical and, at rest, the shaft would make contact with the bearing at the bottom. On starting, the shaft passes through a stage of thin film lubrication with high friction. Meanwhile, gradually, it pumps oil from above under itself from the thicker part of the (approximately) crescent-shaped clearance by means of its adherent boundary layer which sets the oil in motion by fluid friction. Thus, a wedge-shaped oil film forms, with high pressure to the right where the oil enters this pump, and low pressure to the left, at the suction end. The shaded area shows the pressure distribution as to location and magnitude, exactly as in Fig. 9 with the plane oil wedge.

While lifting itself on the oil film, the shaft moves somewhat in the running direction and as soon as the thickness of the oil film, where it is thinnest, becomes thicker than the sum of the roughnesses (peaks) of shaft and bearing, the shaft rides free on the oil and full fluid lubrication is attained. At this moment the bearing has its minimum friction.

For the sake of safety against thin film lubrication, the bearing is so designed as to clearance, oil viscosity and load, that under steady conditions, an oil film thickness is obtained which is somewhat thicker than the minimum thickness, in spite of the slightly greater fluid friction obtained that way.

A glance at the pressure area, Fig. 10, shows that we have to feed in the oil somewhere where the oil film pressure is low, that is to say, in the unloaded area. That is in this case somewhere in the upper half; the best location being somewhat ahead of the pressure area, in the figure somewhere between the letter P and the beginning of the shading. The reason for this rule is that the highest oil film pressures are many times greater than any usual oil pump pressures.

We note that due to the pressure variation in the oil film the shaft runs eccentric in the bearing, "e" being the eccentricity. "e" is greatest when the shaft is at rest and becomes the smaller the faster it rotates. We also note that the pressure hump must tend to flatten out with decreasing eccentricity, for the clearance becomes more uniform until the wedge-shape eventually vanishes. We saw that the wedge shape was the basis of fluid lubrication; an oil film of uniform thickness cannot support any load. Thus, we understand why the shaft will tend to jump up and down and vibrate when "e" becomes very small. A small change of load or an unbalance creates a relatively large change in the pressure distribution due to the sudden change in the film thickness.

Fig. 11 shows the influence of an axial oil groove. The dotted line signifies the oil film pressures without (identical with Fig. 10), whereas the shaded area shows the pressure distribution when the groove "G" is present. The oil film pressure quite generally falls off gradually from its maximum in the middle of the bearing to atmospheric pressure at its ends. Now the axial groove drains the oil from the places where it is needed to build up the high pressure, to places of low pressure no matter whether the groove goes clear through (the worst case) or not. Oil is drained from the most important and sensitive spot very efficiently, for the pressure there is quite high. Thus less oil is available where it is needed and the film becomes thinner, the shaft sags and, behind the groove, builds up a second pressure hump, shorter and lower because it is much closer to the part where the space between shaft and bearing widens.

Comparison of Figs. 11 and 12 shows that axial and circumferential grooves act alike. As a matter of fact, any groove that connects high pressure with low pressure areas has basically the same effect cutting down load capacity and bringing the bearing closer to thin film conditions. Fig. 12 shows the projection of a bearing half, of length "L." Here we show a section through the oil film where its pressure is highest in an axial direction (in Figs. 10 and 11 it was cut in circumferential direction). Then we plotted vertically on the length "L," the pressures "P" in the film and tilted the whole plot into the plane of the paper by 90°. The shaded area is the pressure distribution with the groove, the dotted line shows what it would be without the groove.

Fig. 13 shows measurements by Falz of the bearing temperatures obtained by varying the grooving of a partial, drip fed bearing. Bearing IV has only chamfers (oil pockets). With bearing I conditions are aggravated as compared with a full bearing by excessive centrifugal oil loss through the straight radial groove, for the lack of a cap. Otherwise we estimate the curve (I) would run somewhere between 150 and 200° F. Cases II to IV are normal, that is to say representative of the influence of the types of grooving indicated. It is the differences in bearing temperatures obtained that count.

From the above illustrations and their discussion it follows that the significance of grooves can be appreciated only on the basis of an understanding of the principle of lubrication. Generally the old practice of more or less fantastic and crisscross grooving is a hangover from times where these principles were either

unknown or had not yet found acceptance in practice. The same applies to fitting of bearings. That machinery would run just the same does not weaken the arguments in favor of progressive design and maintenance as well as longer and more dependable service. Moreover, we emphasize again, very frequently modern service is severer. We also want to remind once more, that the cases where the disadvantages of a groove can be offset by richer oil flow and better cooling are extremely rare and call for careful studies of the individual cases.

The importance of the oil as a coolant becomes obvious with the understanding of the basic principles of lubrication. Thus it is equally obvious that cooling of the oil, circulation and, generally, its mechanical, positive application are desirable.

Generally the product of load and speed of a bearing (P x V) are a widely used measure of the heat loss which must be conducted away. Due to the influence of temperature on the limit of safe bearing operation the figure is also sometimes used for the appraisal of safety.

More widely used is the connection between the coefficient of friction "f," oil viscosity Z, speed N and load P.

This relationship is shown in Fig. 14 because it illustrates briefly what was explained in words on Fig. 10 about the starting and running of a shaft. Such a graph as Fig. 14 can be found by experiment for each bearing design and checks well with calculation from theory. To the left of the hook we have the high friction of thin film lubrication of the start (N is small). At the lowest point of the hook (N is greater), the minimum of friction, fluid lubrication sets in as the surfaces of shaft and bearing positively separate. As we proceed with increasing N on the Z N / P line to the right, both film thickness and friction (developed heat) increase.

The practice of the modern designer is to start with a safe film thickness as a basis for the design. It is readily seen that the actual figure that can be taken depends on the finish of the rubbing surfaces. The better the finish the closer we may approach the hook from the right without sacrificing safety, and the higher the load may be or the smaller the viscosity. At the same time we save in heat loss and keep the temperature low.

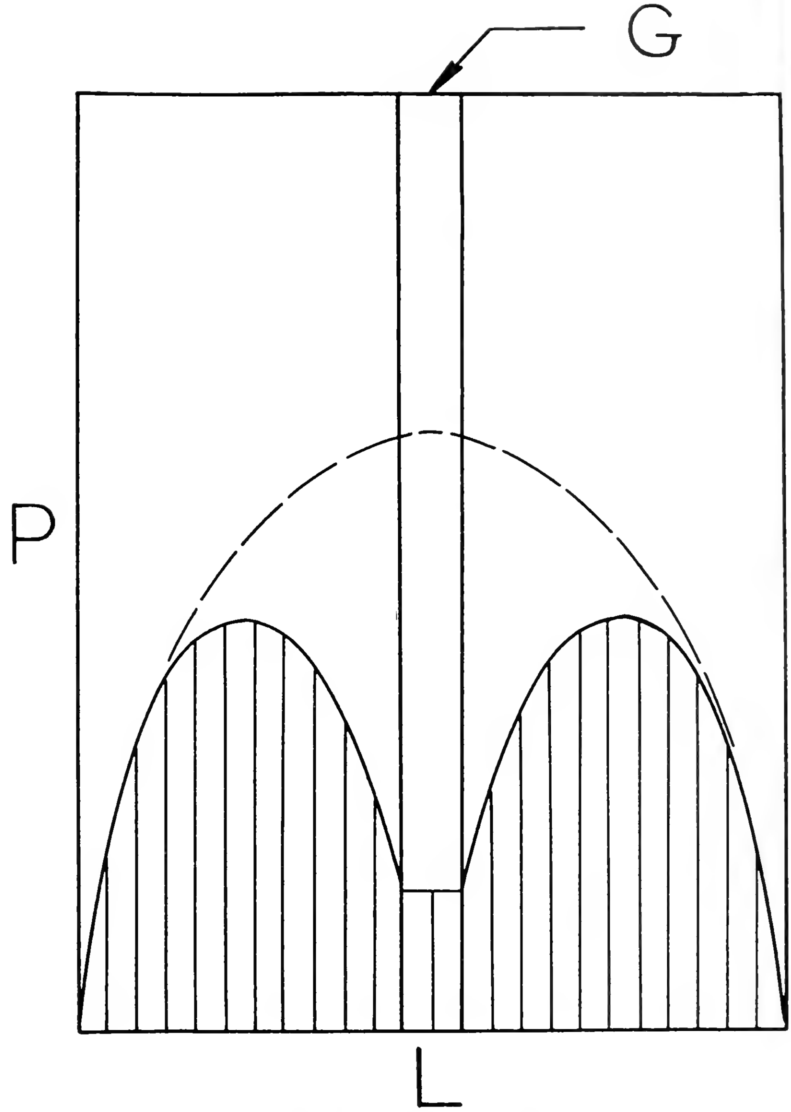


Fig. 12: Variation of oil film pressure P, axially, along the length L of a plain bearing with circumferential groove G (shaded area). Pressure at ends is atmospheric pressure, in groove oil feed pressure. Dotted curve indicates pressures without groove.

We mentioned already that the fatigue life of bearing alloys greatly decreases with increasing temperature. The preceding discussion shows once more the close connection between engine and bearing design and manufacture and lubrication.

One more remark about bearing fatigue can only now be fully appreciated. The enormous oil film pressures, readily estimable from the loads they carry, force the oil into any, however small, cracks that may develop in the loaded zone of the bearing lining and rapidly contribute to its total destruction. This is to emphasize once more the importance of perfect manufacture, installation and low temperature operation.

Addition of Graphite

There is one excellent means for the protection of shaft and bearing surfaces against undue wear and friction on starting and stopping, even in those cases when fluid friction cannot be obtained. Although not a liquid, the addition of a small quantity of "colloidal" graphite to the oil should be encouraged. The explanation of its working mechanism is beyond the scope of this article. There is ample practical experience of its successful application and, operators should keep available a supply to be used for emergency cases just as operators formerly resorted to temporary application of rape or castor oil as a cure for alarmingly hot running bearings. (Page 96, please)

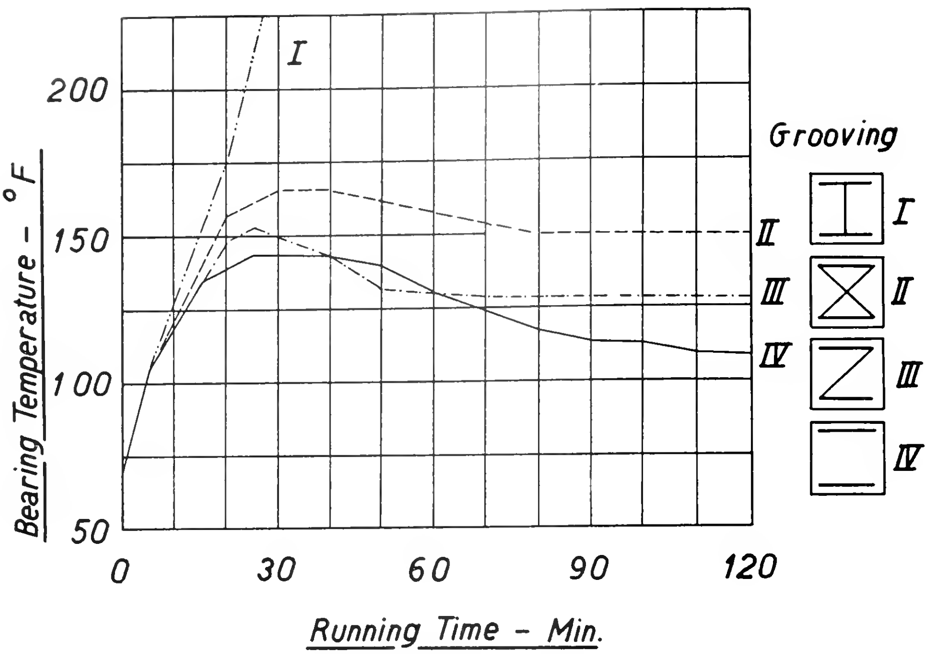


Fig. 13: Bearing temperature and grooving (Falz).

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Note: Space does not permit detailed treatment of most questions. Discussion is restricted to facts and qualitative explanations. Numerical analysis, design procedure and many other details on most of the subject matter will be found in the bibliography.

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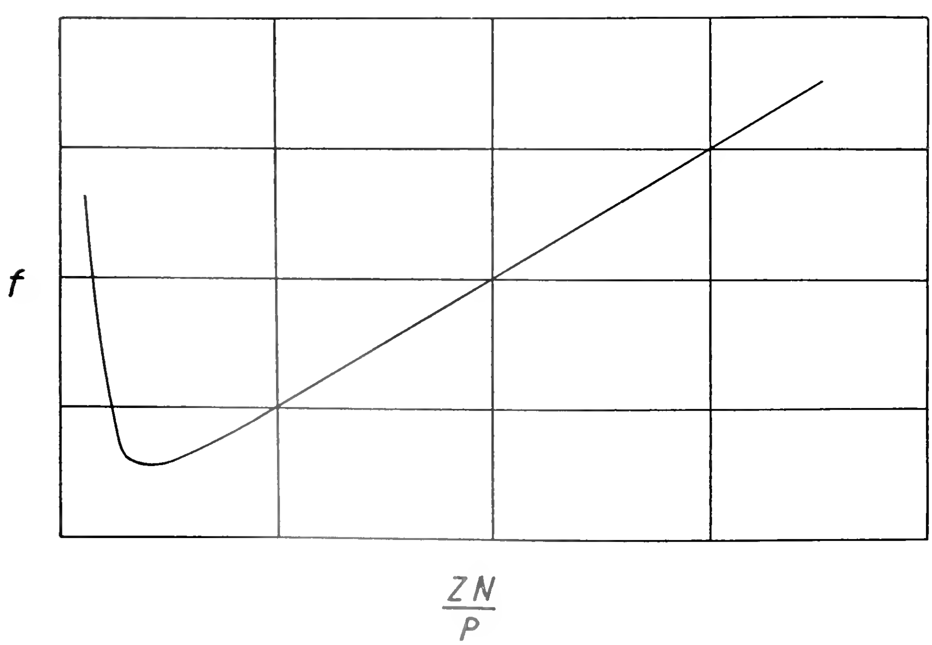


Fig. 14: Relationship between coefficient of friction f, viscosity Z, load P and speed (rpm) N of a bearing.

Marine Exchange NEWS of the MONTH

By M. A. Cremer, Manager

During the month there have been admitted to membership in the Marine Exchange the following: Harry W. Parsons, Inc.; Pacific Sales & Equipment Co.; Captain S. F. Stangeland.

Bay Area Maritime Committee

Thomas E. Lyons, executive secretary, Foreign Trade Zones Board, Washington, D. C., in addressing the group at its regular monthly meeting, stated that a foreign trade zone in the Bay Area would provide substantial employment in the post-war period. He pointed out that such a zone along with the projected World Trade Center would concentrate here all of the factors necessary for a large volume of foreign trade. "The zone in New York has made money consistently, except for a small loss the first year," he said, "and a zone here in the Bay Area should show a profit the first year if it is profitably set up. Operating a foreign trade zone is a business just like a harbor terminal."

Ray I. Hess, Airport Service, A.A.A., stated there would be from 5000 to 7000 planes in the Bay Area within ten years, and stressed the need for an integrated plan of airfields. He pointed out that San Francisco County had no space available for good air fields and that its citizens alone would need 15 to 20 air ports, which must be located in adjacent counties.

Golden Gate Associates

Raymond Young, manager of Shand and Jurs, and a director of the Berkeley Chamber of Commerce, outlined the purposes of the newly organized Golden Gate Associates.

Its aim is at combining in one organization the work now being done by Californians, Inc., Metropolitan Oakland and similar groups.

Mr. Young pointed out that the new group would eliminate the pulling in different directions now experienced; that it could secure county funds not now available; that he has the assurance of some of the large corporations that they feel justified in making substantial contributions to it; and finally that only by means of such a unified promotion agency for the Bay Area as a unit can the Area secure the prestige it deserves or the new industries it has not been able to secure. He also pointed out that only by means of an Area-wide set-up, with sufficient financial backing, can the Area secure the publicity it will need in world markets.

The name "Golden Gate," he concluded, is well known throughout the world. It eliminates the use of the names "Oakland" and "San Francisco."

Post-War Planning

Andrew A. Moran, in commenting on the committee's post-war plan for needed dredging and channel improvements throughout the Area, pointed to need for improving the San Bruno shoals. He stated that few people knew that there is a deep water channel as far south as a short distance below the Dumbarton Bridge. The one hindrance is these shoals, which interfere with operations to and from the Port of Redwood City.

Robert C. Elliott, post-war planning editor of the "San Francisco News," stated that the committee had won a major victory when it succeeded in having Colonel Alexander R. Heron open a Bay Area office in San Francisco of the State Reconstruction and Re-employment Commission.

It is expected that this office will act as a spark plug to bring about and direct joint planning and carrying out of Area-wide plans.

The committee hopes that the office will give some impetus to the aims it has adopted, including the resumption of coastwise and inland waterway services, the drawing up of a plan of Area-wide dredging and channel improvement, and the establishment of a foreign trade zone and the World Trade Center.

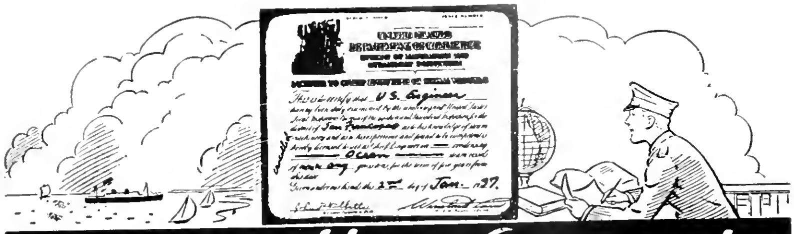
Harbor Day

Harbor Day falls on August 26. Its celebration is being arranged for by the San Francisco Junior Chamber of Commerce.

In addition to boat and swimming races, several ships will be open to public inspection at the Embarcadero, a marine exhibit will be on display in the Ferry Building, and a luncheon will be tendered to supervisors, mayors and other officials from all the counties of Northern California.

There will also be an exhibit on the Exchange floor intended primarily for school children. It is being arranged by the newly-formed Women's Organization for the American Merchant Marine, Inc., Port of San Francisco.

There will be a number of other features to be announced later, which should make this the best Harbor Day ever staged in San Francisco.



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco 11, California

STEERING MECHANISMS

I. GENERAL CONSIDERATIONS

The problem of application of mechanical power to the steering gear has always been a most difficult one because of the extreme range of speed and torque required.

The reasons for this difficulty are illustrated in Fig. 1.

Figure 1-(a) shows a typical minimum of both speed and torque under varying conditions of ship's speed and weather. For instance, the naval architect determines that under maximum speed and weather a torque will be required (indicated either on the rudder post or on the shaft of the power source, whatever it may be), which will be the maximum requirements. This torque will probably occur at maximum rudder angle, and is shown on the speed torque curve at point B.

Under these maximum torque conditions a specified speed is required, which then indicates the horsepower of the drive.

Horsepower equals the speed times the torque divided by 5250 when speed is in rpm and torque is in pound feet. Or, horsepower equals speed times force divided by 550 when speed is in feet per second and force is in pounds.

The horsepower at point B is, therefore, represented by the area No. 3 shown under the curve, and for a typical ship of moderate size, let this value be 50 hp, as shown in the figure.

At small rudder angles, slow speed or mild weather conditions, the torque requirements will be very much less, perhaps a third or a tenth of the maximum.

Having already specified a 50-hp engine, it is good engineering to utilize this power at low torque values if possible in running at higher speeds. For instance, if the engine or drive could be speeded up, the 50 hp would give a high speed lower torque, indicated by area No. 2; or even perhaps, a smart, lively speed, indicated at point A and area No. 1.

These three areas all represent the basic 50 hp. The variable speed shown by the curve indicates a desirable performance of the rudder.

Point A represents the maximum safe speed at which it would be desirable to operate the drive and engine. This represents a maximum utilization of the power available. It is to be noted that all the machine parts must be constructed strong enough to withstand the torques and forces indicated at B and also to be able to resist centrifugal and reciprocating forces due to the high speed at point A.

This characteristic, illustrated in Fig. 1-(a) is called the "constant horsepower variable speed drive."

The speed and torque specified by the naval architect may not be exactly represented by this constant horsepower curve. In fact, they may only specify the torque at maximum condition and the time interval in going from full right to full left rudder, hard over to hard over. But by using high speed when the torque is low, the time requirement can be met and the constant horsepower characteristic more nearly fills the specification with a minimum horsepower rating.

Unfortunately the several types of prime movers, such as the steam reciprocating engine, the steam turbine, the electric motor or other types of engines, do not naturally match this constant hp variable speed characteristic.

For instance, the characteristic of the reciprocating, two-cylinder, double acting, non-cross-compounded, full stroke steam engine (twin engine used for steering, anchor hoist, capstan or winch operation) may be illustrated in Fig. 1-(b).

It is necessary to arrange the gearing and size of cylinders to deliver the specified maximum torque shown at point B, and for illustration let it be the same as that shown in Fig. 1-(a).

The speed torque curve of such an engine is not at all definite or well standardized. At full stroke steam, the speed would be limited by the rate of delivery of steam to the engine, the area of the admission ports and exhaust capacity. At greater speeds the torque would be reduced by reduced steam pressure and increased exhaust pressure.

But at some specific speed and torque the engine would be rated, and at the point shown in the figure, about two-thirds torque, the hp would be 300. This is a great deal more than is really needed, and this large engine is used to supply power to a load which requires only 50 hp on a constant hp basis. The oversize engine is needed for the torque at point B, and at other speeds and torques its output is limited by throttling or reducing admission to fractional stroke.

It might be stated that the maximum torque at point B could be obtained by increasing the gear ratio between engine and rudder post. This would, of course, give more torque at the rudder post for a given engine torque, but as shown by the dotted line in Fig. 1-(a), would not quite give the maximum speed at light torque requirements shown in Fig. 1-(b). The gear ratio must be low enough so that at maximum safe engine speed the rudder speed is adequate. (Note that the miscalled high gear of the automobile is really the lowest gear ratio and the automobile low gear is actually highest gear ratio.)

With respect to each other, the three curves in Fig. 1 are drawn to scale, and relative areas represent relative horsepower.

Thus the steam engine does not show an economical utilization of power capacity as applied to the rudder, and would be operating at over 95 per cent of the time at much less capacity than its rating in torque, and at near its limit of speed, or at high speed light load, a condition not good for long life or economy. Notwithstanding this, however, steam steering engines give a very satisfactory performance, are reliable, lively and easy to maintain, although requiring perhaps more maintenance than other types of drive. The steam piping for supply and exhaust constitutes a serious problem in ship layout and building. Also the steam load is quite a good deal in terms of the total auxiliary load. There is a good deal of condensation in the piping, and it is hard to keep steam tight. Expansion and contraction of the piping require frequent expansion joints and location of the piping must be at the same time well protected yet accessible.

There are many ships afloat with steam steering engines, but the modern trend is toward the electric drive through a variable speed, variable gear ratio hydraulic drive, to be discussed in the next article.

The electric motor, while reliable and lively, also does not lend itself to the required rudder characteristics.

As shown in Fig. 1-(c), its speed torque characteristics are such that a 200-hp motor would be needed to provide the maximum torque that could be provided by a 50-hp constant horsepower drive.

The maximum torque of a direct current motor is limited by the current which can safely be passed through the commutator and armature. Also at full field, a condition for maximum torque, its speed is limited to slightly more, perhaps 20 per cent, than the normal full load speed. The speed at maximum torque may be 20 to 40 per cent less than the full load or normal rated speed. This is indicated in the motor speed torque curve from point A to B.

The motor size and its gear ratio is selected so that the torque at point B is available, and also, that with the field weakened to the maximum safe speed of the motor, perhaps 40 per cent more than the rated value, the speed of the rudder as required at point A is obtained. The control of the motor can be arranged to weaken the field when the torque load is light, and to strengthen it at large and overload torques. But even so, the motor is perhaps four times the size and capacity of the rudder requirement at constant horsepower of only 50 hp.

It is to be noted that where the engine or motor torque curves exceed in speed the required speed curve of the rudder, Fig. 1-(a), the speed is held down by the control. Or if this is not the case, and more speed is given the rudder than really needed at light and medium torques, then more horsepower is drawn from the boilers or the generators and boilers, as the case may be. This is a waste of capacity as well as of fuel.

Thus the motor alone is not a good rudder drive because it is basically a nearly constant speed power source while the rudder is really a constant horsepower load. The ship's electrician may contest this point by questioning as to why the series motor cannot be directly applied to the rudder. The series motor can be designed to give a speed torque curve resembling in general that shown in Fig. 1-(a). The response to this question would be that the series motor will run away and overspeed at light or no loads. This would particularly be the case when the rudder is brought from hard-over to amidship position at full ship's speed. In this case a negative torque or overdrive is found. The rudder wants to come back in the direction the motor is driving it, and runs away with the drive. With the steam engine or hydraulic drive there is sufficient friction in the system and gears to absorb this negative or feed-back power, but with a motor drive the gears would not wholly absorb this reverse power. The control could be arranged to regenerate on negative power to limit speed. In fact, an electric motor and control combination could be worked out to give the required characteristics. It would, however, be perhaps slightly complicated. And, of course,

(Page 108, please)

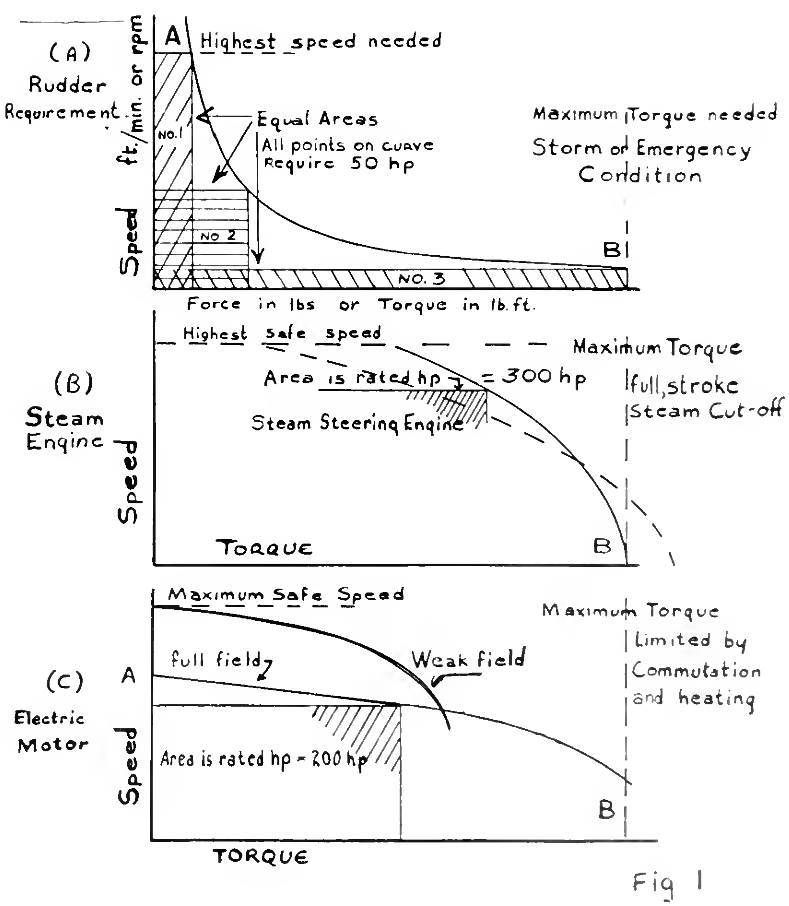
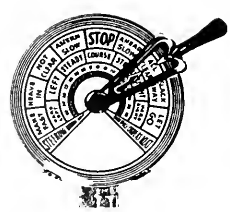


Fig 1

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

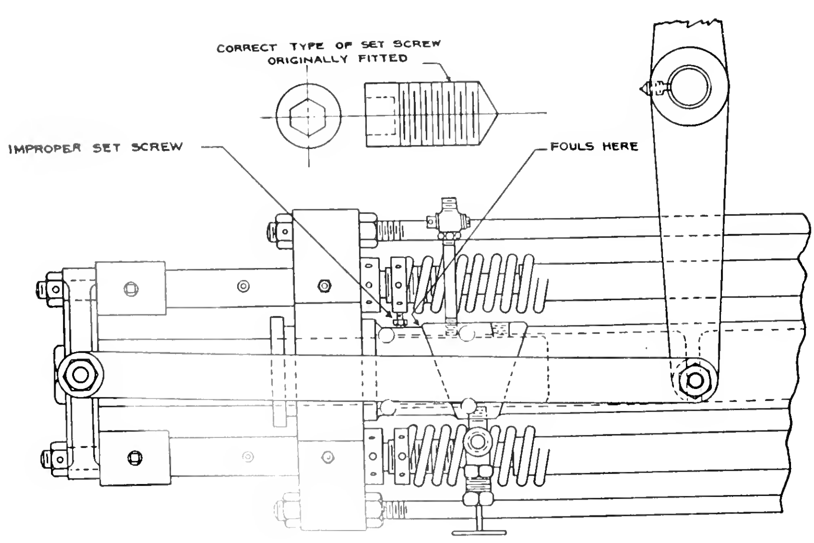
Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

Steering Engine Casualties

So many collisions, near collisions and groundings have resulted from the failure of steering gear in one way or another that Headquarters feels that a few of these cases should be brought to the attention of merchant ship personnel. Steering gear failures are always serious matters, particularly when ships loaded with dangerous water cargoes are traveling in convoy with little room for maneuvering. In one recent collision between a gasoline tanker and an ammunition ship, the resulting fire and explosions caused the loss of all hands on one of the vessels and all but two on the other.

Many of these casualties arise from seemingly insignificant defects, yet their importance is obvious when one takes into account the resultant loss of life, let alone the monetary damage to ship and cargo and the consequent delay in delivery of vital war goods. A very interesting illustration of the above recently occurred in connection with a Liberty ship on which the use of the wrong type of a set screw on the telemotor resulted in jamming the steering gear. Fortunately, the incident occurred in uncongested waters and the auxiliary equipment could be brought into operation before a collision resulted. The particular type of telemotor on board this vessel contained two springs, whose degree of compression was controlled by two adjusting nuts which in turn were held fixed by means of Allen setscrews. The length of these setscrews is such that the top of the heads is nearly flush with the surface of the adjusting nut when tightened. When this Liberty ship had the telemotor overhauled, one of these setscrews was replaced by one of a different type having a protruding head. The error was not discovered until the vessel was on the high seas and the bridge called for full right rudder. Due to insufficient clearance between the setscrew and the cylinder casting, the telemotor jammed and was rendered inoperative. This illustration emphasizes the need on the part of the engineer officer for close surveillance of all engine room repair work while in shipyards and repair bases, and also the necessity of giving all overhauled equipment a thorough examination and test before leaving port.

Other casualties have occurred on vessels with electrically-operated auxiliary machinery where failure of the generator rendered the steering gear, as well as all other auxiliary machinery, powerless. An instance of this kind involved a vessel equipped with two generators for supplying the power to the machinery and a diesel electric plant which operated the emergency lighting system only. Insofar as capacity was concerned, either of the two ship's service generators was adequate to insure continuous operation of all electrically-driven auxiliaries. It was the practice on this vessel while under way to use the generators alternately at intervals of from 8 to 10 days. When changing over, a minimum period of ten minutes was required to bring the spare generator into operation from a cold condition. While this vessel was traveling in convoy a sudden mechanical failure stopped the operating generator, thus depriving the steering gear and engine room auxiliaries of all electrical power. This rendered the vessel uncontrollable, and during the interval required for warming up the second generator, a collision resulted with another vessel traveling in the same convoy. This occurrence clearly illustrates the necessity of having more than one generator in operation or of having a spare set kept in such condition that it can be put into immediate operation in the event of failure of the first generator, particularly at night or when navigating in convoys or crowded waters. Had this been done, or had the hand steering gear been ready for immediate use,



the accident undoubtedly would not have occurred.

The accidents described above, as well as many others that have come to the attention of Headquarters, could probably have been prevented by the application of adequate precautions on the part of the ship's officers. The General Rules and Regulations require that on vessels making voyages of more than 48 hours' duration the entire steering gear, the whistle, the lines of communication, and the signal appliances between the bridge or pilot house and the engine room shall be examined and tested by a licensed officer of the vessel within a period of not more than 12 hours before leaving port. Vessels making voyages of less than 48 hours' duration shall conduct similar tests at least once in every week. The rules also require that the fact and time of such examination and test shall be recorded in the ship's log book. Compliance with the foregoing might not have prevented the failure of the electrical machinery described above, but it probably would have led to the discovery (before the vessel sailed) of the improper setscrew and the consequent jamming of the steering gear when trying to obtain full right rudder. These examinations and tests should never be perfunctory but should be carefully performed by a deck officer on the bridge and an engineer officer in the steering engine room.

An indifferent attitude toward accident prevention measures and routine examinations, and lack of forethought in envisioning possible accidents, lead to machinery breakdowns, with their train of serious and possibly fatal consequences, such as boiler explosions, groundings, collisions, and sinkings. During war time risks occasionally must be taken, but at least we can and must be alert and as ready as possible to cope with emergencies when they arise.

How to Get Along On Lifeboat Rations

During the first year of the war there were spread by word-of-mouth and in the press tales of seamen adrift in boats or rafts for long periods of time, with vivid descriptions of the attendant tortures of thirst, hunger, heat or cold, immersion foot, or similar afflictions. Lately such stories have not been so prevalent or widespread, for few ships now sail alone. Moreover, rescue facilities have been organized to such a degree that it seldom happens that men are forced to spend more than a few days in a lifeboat or raft awaiting rescue. In addition, and even more important as a factor of survival in such cases, the action taken by the Coast Guard in promulgating its wartime safety measures and equipping boats and rafts with additional food and water, signaling and propulsion devices, and other lifesaving equipment, has made extended sojourns in boats not only unlikely to occur, but such that, in those rare instances where they do occur, they are no longer apt to be the torturous ordeal they once were.

Although the likelihood of death from hunger or thirst in a lifeboat has been reduced to a minimum, we must not lose sight of that possibility; and proper measures should be taken to guard against such a contingency. Recent research on the quantity and type of food and liquid required to maintain life has been conducted by the Medical Corps of the Navy; and the Committee on Air-Sea Rescue, under the Joint Chiefs of Staff, has brought out several salient points on how survivors may best preserve health and strength when put on forced short rations of food and water.

First of all, if you abandon ship in a lifeboat or raft in which the food and water containers are undamaged, you have little to worry about. By law, all lifeboats and rafts are now equipped with 10 quarts of water per man capacity, which is sufficient for 20 days (at the rate of 1 pint a day) plus a supply of food, 14 ounces each of chocolate, pemmican, malted milk tablets, and type C ration biscuits per man, to last for a similar length of time. With fewer people in the boat, provisions would, of course, last correspondingly longer. Even if some of the water or food containers should be smashed, there will still be an adequate supply for 12 to 15 days, and rescue can confidently be expected well before that time. Regardless of your expectations of immediate rescue, however, neither food nor water should be wasted, but should always be rationed out equitably to all men by the person in charge.

If you should be forced to abandon ship on a float or piece of buoyant apparatus which has no supply of water and provisions, your plight will be more serious. In all probability you will be picked up by one of the boats or rafts; but even if you should not, don't get panicky, and on no account, no matter how thirsty you become, attempt to drink sea water, either "straight" or diluted with fresh water. Here are a few reasons why: experience in actual cases and experiments conducted on human volunteers have shown that although small amounts taken occasionally will not invariably cause insanity or hallucinations, they will always cause severe vomiting and diarrhea, both of which result in a net loss of valuable water from the body. In addition, the salt in sea water (3 to 3½ per cent) is absorbed by the tissues and has to be washed out by the kidneys, which must use a still greater volume of the reserve water in the body to do so, thereby again causing a net loss. Worst of all, it has been found that the drinking of sea water will not alleviate, but will actually increase thirst. No benefit is obtained by diluting fresh water with sea water to increase its volume.

A few useful things to remember should you find yourself with only a limited supply of water on hand are listed below:

(1) If you had a good drink of water shortly before the casualty, it is not necessary to take a drink for the first 24 hours.

(2) From the beginning, ration out your water at the rate of 16 ounces (1 pint) per man per day.

(3) Water is all-important; food is only a secondary consideration. One can live for at least 20 days without any food whatsoever, but without water, in a hot climate, one would be lucky to survive for 5 days.

(4) Eating meat, fish, or fruit which has been dried makes you more thirsty. If you have plenty of water, that is, from 24 to 32 ounces per day, it is all right to eat the flesh of birds, fish, turtles, etc., which you may catch. If you are on the minimum pint a day ration, it is better to avoid eating such foods, as the kidneys would have to draw water from the body to dispose of the minerals and waste products formed from them. Biscuits, too, are thirst-produc[illegible] less water is plentiful.

(5) If you hav[illegible] sea sickness pills, tak[illegible] every 6 hours for the firs[illegible] two, as water is of cours[illegible] in vomiting.

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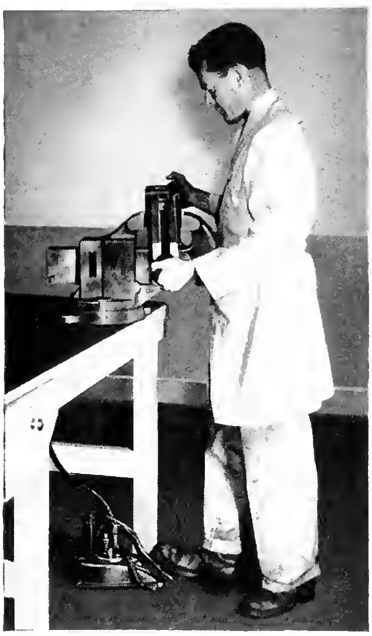
Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

New Hydraulic Vises

Many of the largest shipyards, boat works and machine shops on the Pacific Coast have installed various sizes of the new line of hydraulic vises recently announced by The Brucon Company of San Francisco.



Both hands free.

Designed to speed up production and increase plant efficiency, the rugged construction and simple hydraulic design of these vises assures long operating life under hard usage.

A simple two-pedal foot control allows the operator complete freedom to use both hands gripping or releasing his work in minimum time with minimum effort.

Gripping power is always accurately controlled—delicate materials can be handled without crushing, or several thousand pounds pressure can be applied for heavy work. Ease of operation reduces chances of injury and fatigue, enabling women to handle many jobs formerly beyond their strength.

An important feature is that any standard-make, hand-operated vise—either stationary or swivel—can be converted to Brucon hydraulic action, eliminating the expense of purchasing complete new vise equipment.

New vises and conversion models are available in four different sizes having jaw widths from 3½ inches to 8 inches. Pistons, cylinders and valves are machined to precision tolerance, and packing glands are of specially compounded synthetic rubber.

Engineers, superintendents and mechanics in many of the largest railroad shops, Government yards and aircraft plants, as well as throughout the marine field, have tested and approved the modern hydraulic design of these vises.

A very complete bulletin explaining the important features of operation with diagrammatic cross-section illustrations will be sent to interested plant personnel on request to the manufacturer.

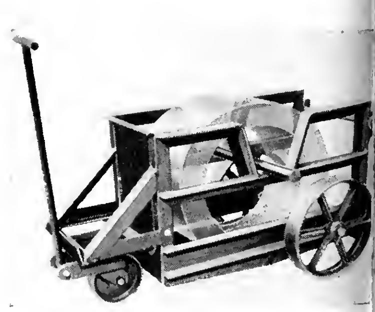
Coil Steel Truck

The continued increase in the width of strip steel, with a consequent enormous increase in coil weight, calls for stronger—and safer—means of handling.

To meet this condition, Palmer-Shile Company of Detroit, Michigan has recently added an improved heavy duty coil steel truck to its line of specialized materials handling equipment.

This truck is built only on order to take care of coils of the size and weight intended to be handled. It is built of heavy angle and plate, and is equipped with three heavy duty roller bearing metal wheels. The safety bar at the rear is chained to one side of the truck. By removing this bar, the coil can be rolled out at rear; or it can be picked up by overhead hoist by means of center bar shown in illustration. The truck illustrated is of one-ton capacity. Inside width is 15″, length 36″. Overall height is 26″, floor clearance 3″.

While designed especially for handling heavy coil steel, the truck is adapted also to handle coils of wire or other products of similar size and shape.



Coil steel truck.

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The manufacturers of the new equipment announced in this department will be pleased to furnish complete details without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

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Send me descriptive data of the following new equipment as reviewed in your .... issue.

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Stubby, An Electrode Holder

Stubby, a new lighter, shorter, smaller-diameter electrode holder of 300-ampere capacity, has just been announced by Martin Wells, Los Angeles, Calif., exclusive manufacturer of the "Suregrip" line of holders since 1927.

In operation, Stubby's principal features are its adaptability to close-quarter work, its high electrical conductivity, 60-degree angle grip on the rod, which improves flexibility in close-quarter work, and the fact that it enables the welder to burn rods right down to the last inch, thus saving up to 14 per cent in rod costs. Its lightness, balance, and small-diameter handle combine to make Stubby a holder that is much less fatiguing to the hand, hence help the welder do a better job all day long. It is expected to be particularly popular with women welders.

The Stubby model: has capacity through 300 amperes; weighs only 14 oz.; is 8¼ inches long; has only 1¼ inches handle diameter; has no screws to work loose; and is 100 per cent insulated.

Lifeboats and Terminal Tubes

At Long Beach, California, the Coast Marine Engineering Company maintains modern offices and an up-to-date manufacturing plant. Its technical organization includes naval architects, marine engineers and marine electrical engineers. Services of this organization are available to boat and shipyards building naval auxiliary and combat vessels. Shop and installation services involving expert workmanship, such as difficult weldments and general marine insulation, are given special attention.

The shops are presently manufacturing two very interesting items for marine use. These are the "Comar" watertight terminal tube and the "Comar" line of plastic lifeboats and wherries.

As shown in the illustration, the "Comar" terminal tube is composed of a stuffing tube section having a recessed collar on the terminal box, plus a gland ring and a gland nut. It is obvious that this terminal tube can be made watertight against the box and around the tube by tightening the two nuts against suitable packing.

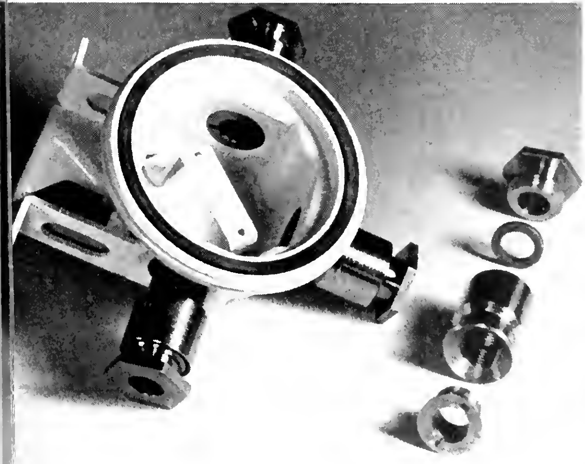
This tube is useful also in making watertight the passage of cables through panels and bulkheads. Its use greatly facilitates repairs and replacements in wiring circuits aboard ship. The "Comar" tube is not subject to corrosion or to failure from shock or vibration. It can be used over and over again, and has a salvage factor of 100 per cent.

"Comar" boats are of a basic plastic, molded as a unit. This plastic boat weighs less than one-third, and is claimed by its makers to have many times the strength, of a wooden boat of conventional construction. Since it is unit-molded it is completely watertight. The material is immune to rot, corrosion, or any deterioration through time or exposure, and is so resilient that it will regain its shape after being subjected to pressure tests that destroy all of the thwarts and all fittings.

The "Comar" executive organization includes Vern C. Schacht, president; E. E. Hardesty, general manager; Edward F. Dolan, business manager; Bailey L. Abbott, purchasing agent; William N. Ruffin, marine electrical engineer; and Harold H. Larsen, chief draftsman.

Below: "Comar" watertight terminal tube.

Right: The "Comar" plastic wherry.



On the Ways—

SHIPS IN THE MAKING

The Nation's Record in Shipbuilding

Delivery of 145 ships with an aggregate 1,379,994 deadweight tons in June brought the year's total ship production to 864 vessels of 8,627,551 deadweight tons. This is 15 vessels and 186,439 deadweight tons short of the 879 ships of 8,813,990 deadweight tons built during the first six months of 1943.

Twenty-eight special type vessels were delivered to the armed forces in June, five more than in May. Evidence of the conversion is noted in Liberty ships delivered, 55 in June, a drop of 12 from the May figure of 67.

West Coast yards built 507,804 deadweight tons, which was 36.8 per cent of the total tonnage for June. There were 507,354 deadweight tons built in Eastern yards, or 36.8 per cent of the total. Gulf Coast yards built 346,547 deadweight tons, or 25.1 per cent, while the 18,289 deadweight tons built in the Great Lakes yards was 1.3 per cent of the June tonnage.

The number and types of vessels built by all yards during June follow:

Shipyard	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co.	4	Tankers
American Shipbuilding Company, Cleveland, Ohio	2	Special Types
Avondale Marine Ways, Inc., Westwego, La.	2	Coastal Cargo
Barret & Hilp	3	Concrete Barges
Bethlehem-Fairfield Shipyard, Inc.	13	Libertys
Bethlehem-Sparrows Point Shipyard, Inc.	1	Special Type
California Shipbuilding Corp.	7	Victorys
Consolidated Steel Corporation	1	C-Type Cargo
Delta Shipbuilding Company, Inc.	2	Libertys
East Coast Shipyards, Inc., Bayonne, New Jersey	1	Special Type
Federal Shipbuilding & Dry Dock Co.	1	Special Type
Globe Shipbuilding Company	2	Special Types
Ingalls Shipbuilding Corp.	2	C-Type Cargo
	1	Special Type
J. A. Jones Const. Co., Inc., Brunswick, Georgia	4	Libertys
J. A. Jones Const. Co., Inc., Panama City, Florida	5	Libertys
Kaiser Company, Inc.	1	Special Type
Kaiser Company, Inc., Swan Island	6	Tankers
Kaiser Company, Inc., Vancouver	6	Special Types
Leathem D. Smith Shipbuilding Co.	2	Special Types
MacEvoy Shipbuilding Corp., Savannah, Georgia	1	Concrete Barge
McCloskey & Co., Tampa, Florida	2	Concrete Cargo
Marinship Corporation	3	Tankers
Moore Dry Dock Co.	4	C-Type Cargo
North Carolina Shipbuilding Co.	3	C-Type Cargo
	2	Special Types
New England Shipbuilding Corporation	6	Libertys
Oregon Shipbuilding Corporation	7	Victorys
Pennsylvania Shipyards, Inc., Beaumont, Texas	2	C-Type Cargo
	3	Coastal Cargo
Permanente Metals Corporation	9	Libertys
	1	Victory
Pusey & Jones Corporation	1	C-Type Cargo
St. Johns River Shipbuilding Corporation	4	Libertys
Southeastern Shipbuilding Corporation	4	Libertys
Sun Shipbuilding & Dry Dock Co.	6	Tankers
	1	Special Type
Todd-Houston Shipbuilding Corporation	8	Libertys
Walsh-Kaiser Co., Inc.	3	Special Types
Walter Butler Shipbuilders, Inc.	3	Coastal Cargo
Walter Butler Shipbuilders, Inc.	4	Special Types
Welding Shipyards, Inc., Norfolk, Virginia	1	Tanker
Western Pipe & Steel Company	1	Special Type

Navy Oiler Launched

To the words of a ringing appeal by the late President Manuel L. Quezon for vengeance against the Japs who bombed civilians in the open city of Manila in 1941, the Navy oiler USS Pasig River was launched July 15 at Marinship, in Sausalito.

The President of the Philippines wired his salute to Marinship workers just before the 50th vessel and the first of the 10,000-hp tankers, being specially built for conversion at this yard for use in the U. S. fleet, was christened Pasig River, for the stream which flows through the city of Manila.

The bottle of champagne was broken by Mrs. John A. McCone, wife of the president of California Shipbuilding Corporation at Terminal Island. Matron of Honor was Mrs. K. K. Bechtel, wife of the president of Marinship Corporation.

During the ceremonies, tribute was paid to Mrs. McCone by K. K. Bechtel, who was master of ceremonies. The flag was raised by a color guard from the U. S. Naval Net Depot at Tiburon, in the presence of Comdr. J. O. Hoffman, Commanding Officer. On the bow of the ship was painted the Philippine flag, with the words spoken by General Douglas McArthur after the Bataan retreat—"We shall return!"

MAKING HISTORY

The preassembled 75-ton bulk of Westinghouse turbine reduction gears is lowered into a Victory ship hull in one piece at the Permanente Metals Corporation Yard No. 2, Richmond, California.

Western P & S Quadruple Splash

Western Pipe & Steel Company held a quadruple launching on July 4 at Los Angeles Harbor when four LSM's (Landing Ships Medium) simultaneously slid down the ways. These ships are highly secret except for the admission that they are more than 200 feet long with open bows from which pour men and materials —and that they were designed for amphibious conquest in the Pacific. They are a very new type of large landing craft, similar to those which have been playing such sensational roles in recent landing operations.

No sponsors christened the LSM ships. The ceremonies consisted of speeches by Sergeant Charles E. (Commando) Kelly, who is the only enlisted man in the U. S. forces to hold both the Congressional Medal of Honor and the Silver Star; Lt. Ernest Childers, another outstanding world war hero; Capt. Albert Norris, Navy Supervisor of Shipbuilding; John Dalton, member of the State Labor Commission; and General Manager M. R. Ward, who stated that this yard has completed five tankers, ten ammunition lighters, seven destroyer escorts, and three ice-breakers, or the equivalent of fifty Liberty ships in man-hours, since the beginning of the war.

The launching of these craft brought to a total of five the number of fighting ships turned out by this yard within a two-day period. On July 2 the Coast Guard cutter Winnebago, fourth of a series of 11 "Lake" type cutters being built by the yard, was launched, with Mrs. P. F. Roach, wife of Commodore Philip Roach, district Coast Guard officer for the 12th Naval District, San Francisco, breaking the champagne bottle.

NAVY GETS ANOTHER SHIP

Miss Beverly Bartlett, sponsor, breaking the bottle at the launching of the U. S. S. Yancey, C-2 type vessel constructed for the United States Maritime Commission and allocated to the United States Navy. The ship was built by Moore Dry Dock Company at Oakland, California. Miss Bartlett is the daughter of M. G. Bartlett, executive of the shipyard.

Last Sea Packhorse Launched

In recognition of the latest and last of the Liberty ships to be built at the Permanente Metals Corporation, Richmond Yard No. 2, an unveiling and dedication of the Statue of Liberty, a replica of New York's famous monument, was held just before the launching of the steamer Benjamin Warner on July 1. The statute was erected through the courtesy of Warner Bros., film producers, as a tribute to the workers of the yard and to the men who sail these vessels.

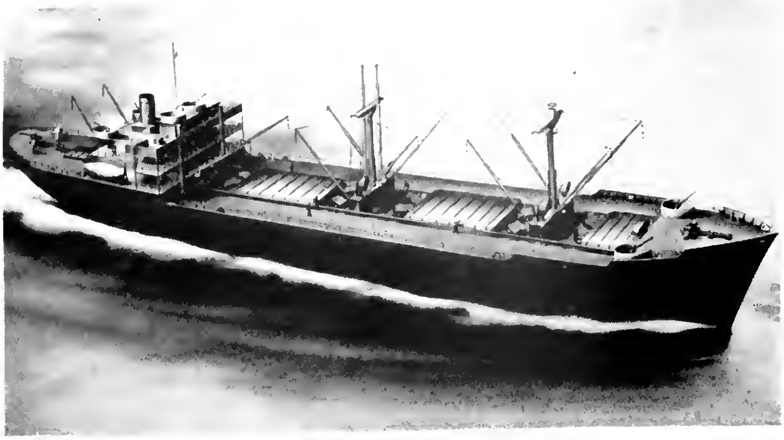
In honor of the father of the motion-picture-producing Warner Brothers, Lita B. Warner, daughter of the late Sam Warner, christened this 519th Liberty ship in the traditional fashion. Mrs. Anne Robbins, oldest daughter of Benjamin Warner, was matron of honor. Among the guests and speakers at the ceremonies were: Harry M. Warner and Col. Jack Warner; Rear Admiral H. L. Vickery, vice chairman of the U. S. Maritime Commission; and Henry J. Kaiser.

As the Benjamin Warner slid down the ways she joined an illustrious list of predecessors which have carried the names of other Americans of achievement into action on far-flung fronts—a veritable fighting host of craft which have earned for the Liberty the proud designation of "Packhorse of the Sea."

"FIGHT WITH IKE"

"Fight with Ike" is the battle cry carried by the 10,000-hp tanker Mission Loreto on her bow as she slides down the ways of Marinship on June 28. This tanker trim was executed by Charles Pearson, former sign painter now working as a hull painter at the yard.

(Photo courtesy Marinship)



200 COASTAL CARGO MOTORSHIPS TO BE BUILT

Here is an artist's conception of a 338-foot 6-inch coastal cargo motorship, 200 of which have been contracted for by the U. S. Maritime Commission with various shipyards on the Pacific Coast and in other shipbuilding sections. These vessels are powered with 1700-bhp diesel engines of the Nordberg and Busch Sulzer types.

Todd Changes Status

On December 8, 1943, under Executive Order No. 9400, dated December 3, 1943, the Secretary of the Navy took possession of and commenced operating the shipyard of the Los Angeles Shipbuilding and Drydock Corporation, San Pedro, California.

Todd Shipyards Corporation was appointed managing agent for the Navy Department, and since December 9, 1943, has been operating the shipyard under the Officer-in-Charge in the capacity mentioned.

Effective on July 10, 1944, by contract with the Navy Department, the status of Todd Shipyards Corporation has been changed, and after that date Todd Shipyards Corporation will operate the shipyard of the Los Angeles Shipbuilding and Drydock Corporation for the United States Navy Department as an independent contractor on a cost-plus-a-fixed-fee basis and not as agent.

Executive Order No. 9400, however, remains in effect, and Todd Shipyards Corporation's operation of the plant of the Los Angeles Shipbuilding and Drydock Corporation is authorized by the Secretary of the Navy pursuant to said Executive Order.

INGALLS' 50TH LAUNCHING

Miss Mary Lee Council is about to christen the U.S.S. Sitka, Navy combat-loaded troopship, at a recent launching of Ingalls Shipbuildiing Corporation. This 18,000-ton all-welded ship was the 50th in the fleet that this yard has sent to war. Others in the launching party are Mrs. B. H. Downs, matron of honor; Miss Elaine Raymond, maid of honor; and Comdr. H. C. Raymond, U.S.N., of Pascagoula, Miss.

Federal's Production

A ship every five days is the rate at which the Federal Shipbuilding and Dry Dock Company at Kearny and at Port Newark, New Jersey, has been backing the attack since Pearl Harbor, it was recently announced by Lynn H. Korndorff, president of U. S. Steel's Federal shipyards.

"Speed and skill in producing quality ships—which must meet the highest of Navy and Maritime Commission standards — have characterized our two-and-one-half-year war record," Mr. Korndorff said.

The building record of the yards since Pearl Harbor follows:

Kearny Yard

10,000 ton C-2 Cargo Ships	12
C-2's converted into Combat Cargo Ships (Naval Auxiliaries)	14
Tankers	2
6000-ton Cruisers	2
20,000-ton Troopships	7
Destroyers	58

Port Newark Yard

Destroyer Escorts	42
Landing Craft, Infantry (large)	36
Landing Ship Medium	10
Total	183

Seattle Seeks SS A. F. Haines

Seattle shipping men and civic groups have requested that the War Shipping Administration assign the Liberty ship Ancil F. Haines, named after one of the most important figures in Pacific Coast maritime circles, to the American Mail Line for operation out of Seattle.

The vessel, recently completed by the Delta Shipbuilding Company in New Orleans, was christened by one of Mr. Haines' daughters, Mrs. Dan Gould of Oakland, California.

Former associates of Mr. Haines have pointed out that it would be fitting to have the American Mail Line operate the vessel, since Mr. Haines was vice president and general manager of the organization from 1922 until the time of his death in 1937.

Mr. Haines served with Dodwell and Company, operating ships from Puget Sound to the Orient; the Pacific Alaska Navigation Co.; the Pacific Steamship Company; the Admiral Oriental Line; and the American Mail Line.

New Cruiser to Honor Bremerton

A new heavy cruiser, constructed at Camden, New Jersey, was launched on July 2 and christened with the name U. S. S. Bremerton, after the Puget Sound city where the great Navy yard is located. The vessel was named after the northwest city as the Navy yard workers' reward for besting the workers at the Mare Island Navy Yard in a War Bond purchasing contest.

Three Bremerton citizens journeyed to Camden to take part in the christening. They were Miss Betty McGowen, a Navy yard worker, who was chosen sponsor; Mrs. Kenneth L. Key, wife of a Navy yard supervisor, who represented the Bremerton Round Table club and acted as matron of honor; and little Cynthia Coyle, daughter of Dr. and Mrs. Joseph Coyle of Bremerton, who acted as flower girl.

Bryant Boat Company Completes Job

Bryant's Marina, Inc., of Seattle has delivered the MT-730, known as a towing yawl, completing a contract for 60 vessels for the United States Army. Jerry Bryant, president of the firm, declares that the contract has been completed two months ahead of schedule. A previous contract for 20 similar vessels was completed in 1943, also two months ahead of schedule.

The total of 80 boats have all been constructed for the Army Transportation Corps, originally designed as mine layers but now adopted as a general utility boat or "water jeep" because of their high degree of seaworthiness, maneuverability and ruggedness. The boats are 26 feet overall and eight feet beam, and are powered with a 68-horsepower diesel engine.

Safe Shipbuilding

Fifteen divisions of production workers in the California Shipbuilding Corporation yard on Terminal Island have rounded out a five-month period without a lost-time injury.

Champions for the period were Calship's swing shift subassembly welders and burners. They worked 655,000 man-hours without a lost-time injury.

Pipefitters on the yard's graveyard shift were runners-up with 390,000.

Here's the score for the five months, as reported by Lawrence C. Miller, Calship safety engineer:

Day Shift

Division	Man-Hours Worked
Material	250,000
Sheet Metal	225,000
Labor Clean-Up	225,000
Facilities Construction	130,000
Machine Shop	110,000

Swing Shift

Subassembly Welders and Burners	655,000
Training	185,000
Materials	135,000
Sheet Metal	130,000
Plumbing	100,000

Graveyard Shift

Pipe	390,000
Outfitting Shipfitters, Drillers, Chippers and Burners	180,000
Toolroom	155,000
Paint	130,000
Maintenance	85,000

ARMY'S SEAGOING HOSPITAL

Every modern facility for the comfort and safety of American wounded has been built into the Blanche F. Sigman, transformed from a Liberty cargo ship by Todd Shipyards Corporation Hoboken Division into this seagoing hospital, first of six Liberty-hospital ship conversions for the U. S. Army Transportation Corps. Todd workers line rails as the ship, named for heroic American nurse killed at Anzio, leaves the yard.

An interesting view of the outfitting docks of California Shipbuilding Corporation, Terminal Island, California.

YOUR PROBLEMS ANSWERED

(Continued from page 99)

no control can be designed to prevent the huge pull of power on the electric plant when maximum torque is needed. Also, no control could prevent the constant starting and stopping of the motor in the ordinary course of steering a ship. This continuing use of intermittent power might cause light flicker and require large auxiliary generators. The electric plant must be in operation at all times in sufficient capacity to provide the maximum torque when called for, even though a month's steaming will not log this maximum condition.

All of these conditions, then, seem to make the rudder constant hp load the ideal application for the hydraulic control between the power source and the rudder.

The hydraulic system will be discussed from a schematic viewpoint in the next article.

STEADY AS YOU GO!

(Continued from page 101)

(6) If you are in a warm or hot climate, take extra pains to see that as little water is lost through perspiration as possible. To effect this, rig an awning overhead to protect you from the sun's rays, but leave the sides open to enable the breeze to cool your body. To this end, most of the clothes should be removed during the hot hours of the day. If you have no way of improvising shade, sit upright so that the least possible body area is exposed to the heat of the sun. Keep your clothes constantly soaked with sea water in the daytime, for this will cool your body by evaporation and conserve your body water. Clothes should be dried out before evening, however, for you may get a chill even in the Tropics once the sun has set.

Recent Calship Launching

Twenty-ninth Victory ship from the yard's Terminal Island ways, the 455-foot S. S. Grange Victory, was recently outfitted by the California Shipbuilding Corporation. The vessel was launched on July 17 from one of the yard's 14 shipways.

Mrs. Martin P. Durkin of Washington, D. C., wife of the president of the United Association of Journeymen Plumbers and Steam Fitters, christened the ship in honor of the town of Grange, Arkansas. Grange is one of the "typical" American towns chosen by the Maritime Commission Ship Naming Committee for the Victory shipbuilding program.

Banker at Launching

Paul Cadman, for several years economist of the American Banking Association, New York, upon his return to San Francisco participated in the launching ceremonies for the S. S. Honduras Victory, Shipyard No. 1, Permanente Metals Corporation, Richmond, held on July 7.

He was joined at the shipside by Henry J. Kaiser, with whom he is to be associated in the field of economic research. Mrs. Arthur Ballantine, wife of the New York attorney, sponsored the vessel, with Mrs. Frederick Koster, wife of a San Francisco civic leader, as matron of honor.

New Branch Offices

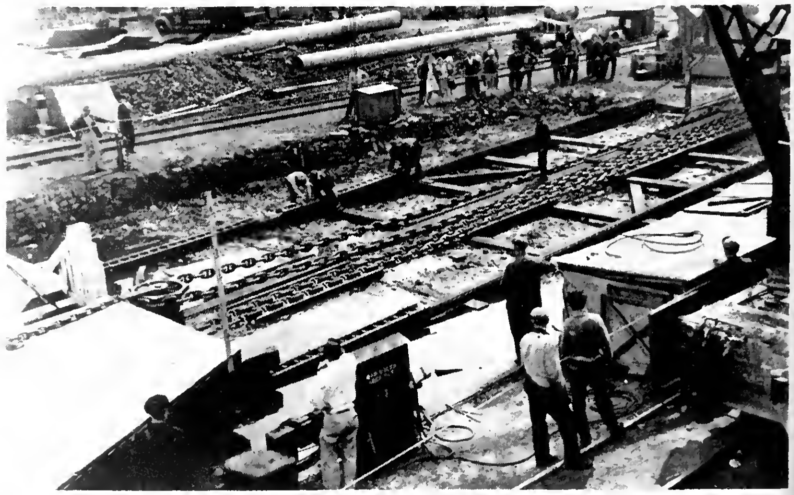
Martin and Turner, distributors of marine and industrial supplies, 314 Wilmington Boulevard, Wilmington, California, have opened branch offices at 274 Brannan Street, San Francisco.

Tracy Gaffey is manager of the San Francisco branch, which has been in operation since the middle of May. He is assisted by L. E. Rogers and James Lea, who has just recently joined the organization. Lea was formerly connected with the Kaiser Company in the purchasing department at Oakland.

The Marin and Turner organization specializes in wire rope, turnbuckles, shackles, Crosby Clips, hooks, blocks and sheaves, and other marine and industrial equipment.

AGED CHAIN STILL GOING

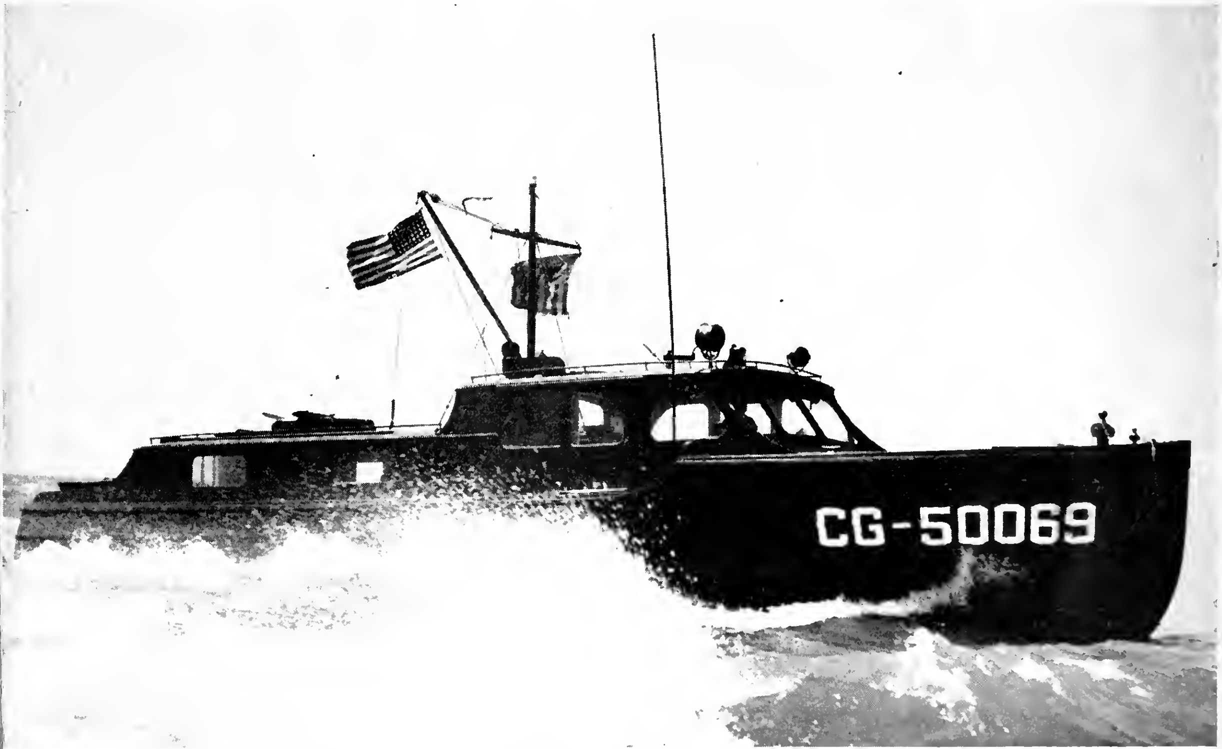
Here is a Byers wrought iron chain that is claimed to be the oldest marine railway chain in the United States. The picture was taken at Penn-Jersey shipyards during a launching as the ship moved down the railway to the water. Does any marine railway operator know of an older chain?



Running LIGHTS

Who When Where

Edited by B. H. Boynton



Civilian volunteers—many of them yachtsmen—have joined the Coast Guard Auxiliary and are manning this type patrol craft of San Francisco Bay, thus releasing regular Coast Guardsmen for combat duty at sea.
Official U. S. Coast Guard Photo

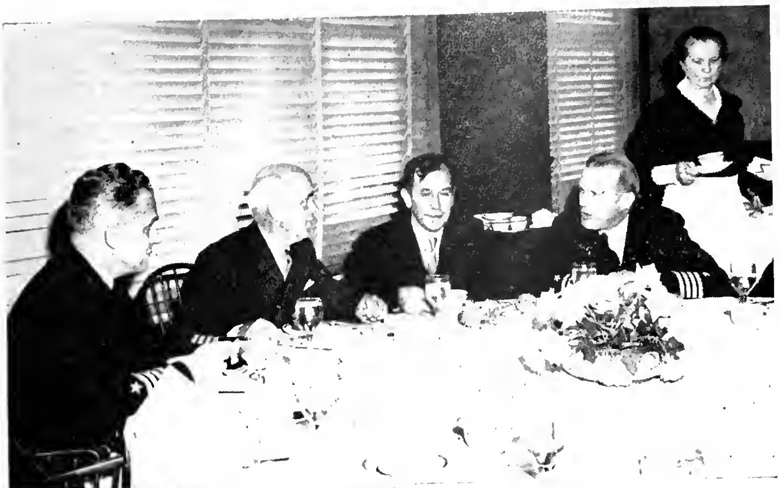
154th Birthday of the Coast Guard

The Coast Guard, oldest sea service in the nation, commemorated its 154th birthday on August 4, but the men of this service were much too busy doing a real job on all theatres of war to take "time out" for celebration.

To many Americans, Coast Guard means lookout towers and small white surf boats that go out in summer squalls and rescue capsized sailboats. But the men of this service have already blazoned their seabags with such names as Normandy, Saipan, Fedala, Tulagi, Florida Island, Guadalcanal, Sydney, Attu, Tarawa, the Marshalls, to name a few, where they helped man the landing craft that set Marine and Ranger troops ashore on enemy beaches.

A home front Coast Guard duty that is vital is Port Security. Many a civilian is helping to do his or her bit as a member of the Volunteer Force in San Francisco and Oakland to safeguard harbors, docks and waterfront facilities of ports from fire, sabotage, accident and negligence, and they are helping to insure the uninterrupted flow of men, munitions and materiel to the fighting forces overseas. And—they are giving more Coast Guardsmen an opportunity to serve with their shipmates on the invasion fronts.

The Coast Guard's motto—"Semper Paratus"—"Always Ready," was never more exemplified than it is now in this war.



Speaker's table (above), left to right: Captain Kransfelder, George M. Nichols, Speaker Harry E. Kennedy, Captain Kell, USN, and Ella (an Engineering Club feature).

Naval Architects Discuss Welding

On Friday evening, June 30, at the Engineers Club, San Francisco, the Northern California Section of the recently formed Society of Naval Architects and Marine Engineers, held their second dinner and technical session.

Chairman George M. Nichols, vice president and manager of Construction and Repair, Matson Navigation Company, presided. After a short business session and an approval of the minutes as read by the genial Secretary-Treasurer, Clarence M. ("Dad") Le Count, sales engineer, General Electric Company, Chairman Nichols introduced the speaker of the evening, Harry E. Kennedy (member), who presented a very interesting and informative paper on the subject, "Some Observations on Welding and Welding Stresses."

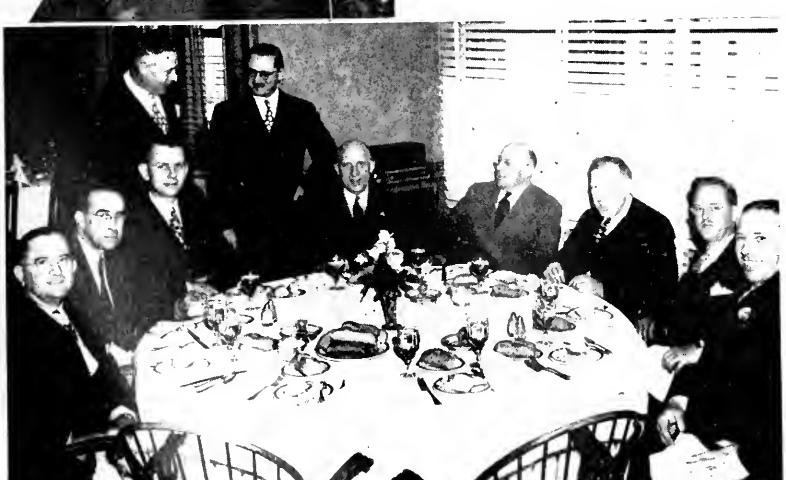
Kennedy is a Research Engineer and the inventor of the famous "Union Melt" welding system which has been so universally applied in the great shipbuilding program of the U. S. Maritime Commission. His paper was chock full of technical information and of competent, expert opinion based thereon.

Four men from the faculty of the University of California, each of whom is qualified as a competent research expert on welding and metallurgy, had prepared discussions on this paper. These men are Professor Finn Johanssen, Professor H. E. Davis, Professor Earle Parker, and Lieutenant Merriam.

A large group of members and guests were present and considerable discussion arose from the audience. The paper has drawn considerable favorable comment from outside sources and will probably be printed in the transactions of the Society.

Left: Guest Speaker Harry E. Kennedy at the mike.

Below: Group of well-known San Francisco marine engineers.



Shipyard Labor Relations

The War Shipping Administration announced that D. S. Ring, director of the Division of Shipyard Labor Relations, United States Maritime Commission, and his staff are authorized to represent WSA in all matters relating to wage scales and standards in repair yards under its control. Grievances and disputes in shipyards and ship repair yards may be referred to the division by the Assistant Deputy Administrator for Maintenance and Repair. General stabilization policies will be approved by Vice Admiral Emory S. Land, WSA administrator, and Rear Admiral Howard L. Vickery, deputy administrator.

The staff will also furnish advice and assistance on these matters on request of management or labor. In all such activities where agreements are not reached, the matter shall be referred to the Administrator, WSA said.

Emory S. Land commissioned Vice Admiral—Secretary of the Navy James Forrestal, on behalf of the President, presented to Rear Admiral Emory S. Land, USN (Ret.) (second right) his commission as a "Naval Constructor in the Navy, with the rank of Vice Admiral" in the Secretary's office at Washington, D. C., on July 14. Looking on as the Secretary reads the document are Mrs. Land and Undersecretary of the Navy Ralph A. Bard.

Official U. S. Navy Photograph

"JERRY" LAND
Commissioned Vice Admiral

Rear Admiral Emory S. Land, known to friends and intimates as "Jerry," was born in Canon City, Colorado, January 9, 1879, the son of Scott E. and Jennie Taylor (Emory) Land. He graduated with a Bachelor of Arts degree in 1898 from the University of Wyoming.

Appointed to the U. S. Naval Academy in September, 1898, he graduated with honor in 1902, going to the Asiatic Station on the U. S. S. Oregon for two years. At Annapolis he was presented with the Sword of General Excellence in Athletic and was Cadet Commander of the battalion in his graduating year, and received the Bachelor of Science degree.

Commissioned an Ensign, U. S. Navy, he completed a post-graduate course in Naval Architecture at the Massachusetts Institute of Technology, receiving an M. S. degree in 1907.

"Jerry" Land was appointed: Assistant Naval Constructor (1908) with the rank of Lieutenant (Junior Grade); Naval Constructor with the rank of Lieutenant (1912); Lieutenant Commander, Construction Corps, (1916); Commander (1921); Captain (1923); Rear Admiral (1932); and by special Act of Congress Vice Admiral on July 1, 1944.

On the staff of Admiral Sims in London in 1918, he was awarded the Navy Cross with the citation:

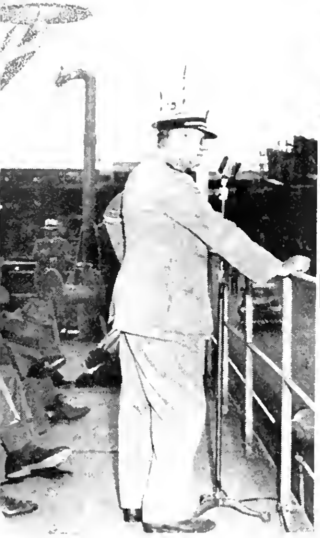
"For distinguished service in the line of his profession in connection with the design and construction of submarines and for work in the War Zone."

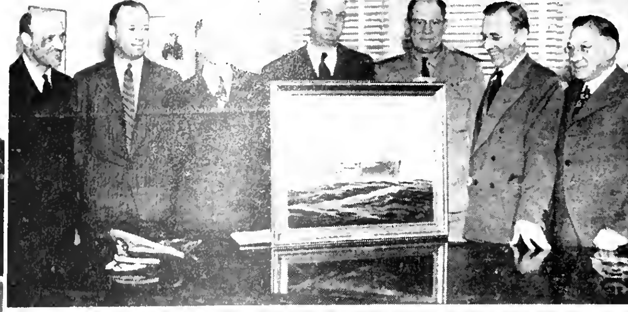
Admiral Land in October, 1932, was assigned to duty as Chief Constructor of the Navy and Chief of the Bureau of Construction and Repair, and permanent appointment to those positions was made on March 15, 1933. He was placed on the retired list of naval officers, with the rank of Rear Admiral, on his own application April 1, 1937, after 39 years of service. On April 16, 1937, he was appointed a member of the U. S. Maritime Commission for a six-year term, and was assigned immediately to supervise the Maritime Commission's construction program. Admiral Land was named Chairman of the Maritime Commission by the President, February 18, 1938.

Other appointments include: Director of Shipbuilding under the Advisory Commission to the Council of National Defense; Chairman of the Strategic Shipping Board; Administrator, War Shipping Administration; and, American Member of the Combined Shipping Adjustment Board.

Decorations include: Spanish Campaign Badge; Victory Medal, World War, (Submarines); Navy Cross; Honorary Commander, Military Order British Empire; The Army of Occupation of Germany Medal; Arthur Williams Memorial award; and Gold Medal of Bolivar San Martin of the Pan American Society.

From 1940-1942 he served as President of the Society of Naval Architects and Marine Engineers.





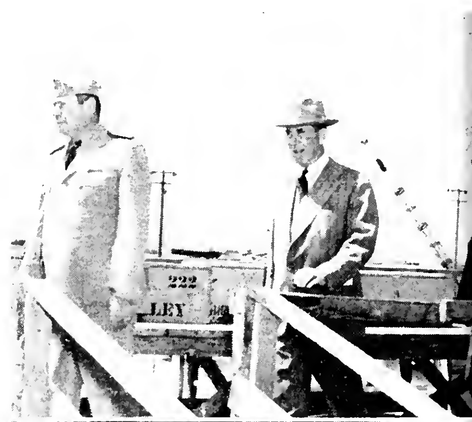
Photos Courtesy of Marinship

Left: You are doing a splendid job. Keep it up! Rear Admiral Howard L. Vickery compliments the workers of Marinship.

Center: Vickery among those gathered during the presentation of the oil painting of S. S. Mission San Gabriel, Marinship tanker, to K. K. Bechtel (second from right) by representatives of General Electric Corp.

Right: The Admiral inspects the T-2 tanker S. S. Mission Buenaventura, accompanied by his aide, Lt. William Weber, and Marinship's key construction men.

Vickery's Tour of Pacific Coast Yards



Left: Rear Admiral Vickery and Carl W. Flesher, regional director for the Pacific Coast, during a launching at Western Pipe & Steel, San Francisco.

Right: Vickery, Barrett and Flesher inspecting the Barrett & Hilp Belair Shipyard in South San Francisco.

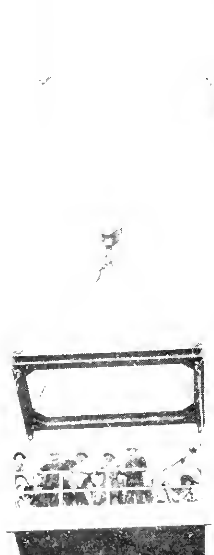
Left center: Night scene at Vancouver yard of Kaiser Company.

Right center: Vickery and party exceeding the 5 mile limit posted at Swan Island.

Lower left: Admiral Vickery and Edgar Kaiser at Oregonship luncheon.

Center: Vickery's party getting a bird's-eye view of Richmond yards.

Lower right: While on tour of Moore Dry Dock Co. in Oakland, the party posed for picture around the figurehead statue reputed to be a likeness of Timothy A. Folger.



Left to right: Jack Heise, editor; Patricia Olsen, associate editor; Larry Novak, staff photographer of "Flood-Tide."

ASSOCIATED'S "FLOOD-TIDE"
Wins National Honors

Hundreds of war plants in the nation have taken to the publishing of employee distribution magazines—a book by and for the plant employee—as an aid in keeping morale high and to instill a fighting spirit in the entire crew.

At the recent meeting of the National Council of Industrial Editors' Association held in Cleveland, the "Flood-Tide," plant magazine of Associated Shipbuilders in Seattle, was judged to be the finest publication of all the entries by the plants representing the entire national war production field. In the letter accompanying the scroll award, Jessie Bakker, secretary of the Association, pointed out that "since more than 1500 publications were submitted and only a total of 58 awards made, you are to be congratulated on having submitted the winning publication."

The men and women who have furnished the inspiration and toil are to be cheered. Editor Jack Heise, widely known as a Northwest newspaper and public relations man, who has been heading the magazine staff for the past nine months, hopes the award will urge his staff on to even greater efforts. Other full-time employees are Patricia Olsen, associate editor, and Phyllis Roberts, women's editor. Plant employees contributing their talents to the publication include Larry Novak, yard photographer; Bill Casey, purchasing department, sports editor; and Milo Kinn, painter, staff artist and cartoonist.

Left to right: Bill Casey, sports editor; Phyllis Roberts, women's editor; and Milo Kinn, cartoonist of the staff.

J. Frederick Jones

Lilygren Covers the Coast

"We cover the entire Coast" proudly proclaims the Albert J. Lilygren Co., manufacturers' representatives of a score of marine products, who now can point to a Seattle, Portland, San Francisco and Los Angeles Harbor chain of selling offices, after the recent opening of a San Francisco establishment located in the Marine Building at California and Front Streets, with J. Frederick "Freddy" Jones in charge.

The Lilygren firm operates as representatives only and does not engage in jobbing work. It renders service to prime contractors on small craft, tugboat landing and invasion craft for Army, Navy, merchant marine and the industrial fields.

In Seattle, the company has Hal Shaver in charge of the offices at 558 First Avenue South. In Portland, the offices in the Security Building are under management of Elliott Higgins.

Fred Jones, at San Francisco, is a young pioneer of shipbuilding and boat outfitting scenes of action—both around the Bay Area and in the Los Angeles maritime district. Fred started at the Moore Dry Dock Company in Oakland in '26, progressed to better posts with Union Iron Works, San Francisco, and Todd in New York, became estimator at the Federal yard in Kearny, and then shipped out as an engineer for several voyages. After a session in Singapore with U. S. Steel, he returned to the States in '39 and joined Consolidated Steel Corp., where he helped engineer the first tank-lighters built on this Coast. In '43 he became a test engineer for Los Angeles Shipbuilding Co. after which he became associated with the Lilygren Company in the San Pedro-Wilmington district, concentrating his efforts on jobs for big ships and Navy vessels.

In Los Angeles the selling firm is located at 110 North Avalon Boulevard, with Walter P. Humes in charge. Fred Jones regards Walter as his mentor and coach!

Assignments to Port Staff

Brigadier General C. H. Kells, commanding general, San Francisco Port of Embarkation, early in July announced new assignments for three officers of the operations staff of his command.

Colonel John H. Mellom, superintendent of Water Division, SFPE, was named assistant to the Commanding General. Colonel Andre Violante, former deputy superintendent of Water Division, was also named assistant to the Commanding General. Colonel Jack A. Fraser, former director of Transportation in the South Pacific Area, was named superintendent of Water Division.

Regular Army officers, long associated with Army Transport Service, which the Water Division replaced, Colonels Mellom and Violante have been stationed at the Port since before Pearl Harbor.

Colonel Fraser, new head of one of the Port's main operating agencies, entered Army service from civilian life in March, 1942. At that time he was district manager of the Baltimore District of American-Hawaiian Steamship Company, San Francisco. After several months at SFPE, he was sent overseas to serve as director of Transportation for Army Service Forces in the South Pacific. On his recent return he was reassigned to San Francisco Port for duty.

MATSON'S CAPTAIN DECORATED

Elis R. Johanson, master of the Matson liner Monterey, is shown receiving the Merchant Marine Distinguished Service Medal from Admiral J. S. Greenslade, USN, for action with the enemy. When Grace liner Elena, carrying 1700 Canadian troops, was torpedoed during a night attack off Naples, Italy, his ship was ordered to the scene. She moved in close and the crew, by a demonstration of outstanding seamanship, rescued everyone aboard the stricken liner.

WHO'S WHO afloat and ashore

Eugene Holman

Esso's New President

Eugene Holman, a vice president of the Standard Oil Company of New Jersey, was elected president of that company on June 12 to succeed Ralph W. Gallagher, who was made chairman of the board.

Mr. Holman was born in San Angelo, Texas, in 1895, and graduated from Hardin-Simmons University in 1916, taking his Master's Degree in geology at the University of Texas in 1917. His first job after World War I, in which he served as a Corporal in the Army Signal Corps, was with the U. S. Geological Survey.

In 1921, he went to Humble Oil & Refining Company at Houston, Tex., where he became chief geologist in 1926. Two years later he joined the production department of Standard Oil Company (N. J.) in New York, where his work became centered on the problems of oil production in foreign countries, particularly in South America. By 1932 he was vice president in charge of production of Pan American Foreign and president of Lago - Petroleum Corporation. In June, 1940, at the age of 45, he was elected a director of Standard Oil. In 1942 he became a vice president, and later a member of the Executive Committee.

K. C. Tripp Named Manager

K. C. "Casey" Tripp, Portland manager of the Moore-McCormack Lines, Inc., has been appointed Pacific Coast manager, with headquarters in San Francisco. He replaces Kirkwood H. Donavin, who resigned.

Prior to becoming Portland manager, Mr. Tripp was Western freight traffic manager of the firm from the time it opened its offices in San Francisco more than three years ago. Previously he had held executive positions in various steamship and foreign trade companies on the Pacific Coast.

Tom Short's Aloha Wins Yacht Race

Though crossing the finish line nearly four minutes after Arch Beckett's Pajara had completed the course, Tom Short's Aloha, of the St. Francis Club, won the featured division 7 race of the Richmond Yacht Club regatta early in July. On corrected time, Aloha had approximately 12 minutes to the good.

The most numerous division on San Francisco Bay was Division 11 in which 23 craft competed. Wilfred Vosti's Bonita of the Golden Gate Club won on corrected time over Harry Davis' Aeolian entry, the Minerva.

Extremely close finishes featured the Farallone Clipper, Bear and Bird classes, in the latter less than a minute separating the Puffin, sailed by Bruce Dohrmann, and the Teal with Myron Spaulding at the helm. In fact, it was decided by exactly nine seconds.

Lt. Comdr. W. C. Peet, Jr.

New Coast Director of USMC

Lieutenant Commander W. Creighton Peet, Jr., USNR, has been appointed Acting Pacific Coast Director of the Maritime Commission to fill the vacancy caused by the death of E. C. Mausshardt.

Lt. Comdr. Peet was appointed Secretary of the Maritime Commission in April, 1937, and went to the West Coast in June, 1943, as War Shipping Administration's Pacific Coast director. In this position he will continue to serve.

Mr. Mausshardt, who served with the Government for more than a quarter of a century and was one of the most popular officials in this area, succumbed to a heart attack at his home in Palo Alto on July 17. He was a native of San Francisco.

Edward Mausshardt

William S. Morris
appointed vice president in charge of Steam Locomotive and Divisional Sales.

American Locomotive's Appointments

The Executive Committee of the Board of Directors of the American Locomotive Company recently announced the following appoints:

Perry T. Egbert, vice president in charge of Diesel Locomotive Sales, has served the company in sales capacities since 1921, when he was appointed technical representative in the Far East, returning to the U. S. in 1924. He graduated from Cornell in 1915 with a Mechanical Engineering degree.

William S. Morris, vice president in charge of Steam Locomotive and Divisional Sales, was formerly executive vice president of the Montreal Locomotive Works, Ltd., the company's Canadian subsidiary. He entered the business in 1922 as a special apprentice at the Schenectady plant, and later held various sales positions, including a four-year period as district sales manager with headquarters in Chicago. He served in the U. S. Army during World War I and graduated from the U. S. Naval Academy in 1922.

James D. Vaughan, comptroller, has been executive assistant to the President for seven years. Previously he was with Price, Waterhouse & Company, and also spent a number of years in Cuba with United Fruit Company. He attended the Bentley School of Accounting, and Boston University and is a member of the American Institute of Accountants.

Perry T. Egbert,
vice president in charge of Diesel Locomotive Sales.

James D. Vaughan
appointed comptroller, American Locomotive Company.

Announcement

The name of the American-Terry Derrick Company of South Kearny, New Jersey, has been changed to American Hoist & Derrick Company, Plant No. 2, South Kearny, New Jersey.

George Schott (at right) is now acting chief hull inspector for the Maritime Commission of Belair Shipyard, Barrett & Hilp, South San Francisco, on both day and night shifts. The increased duties were assumed by Mr. Schott when Luther McMakin, on day shift, took a recent leave of absence because of ill health.

Harold R. Swanton

New Head of Precision Bearings

At the annual meeting of the Board of Directors of Precision Bearings, Inc., of Los Angeles, Odbert P. Wilson resigned as president and was elected chairman of the Board of Directors. Harold R. Swanton was elected president of the firm.

The following officers of the company were also elected: Frederick W. Mesinger, vice president; L. H. Travis, treasurer and assistant secretary; Edward C. Lennon, secretary.

The Board of Directors of the firm for the ensuing year are: Edward C. Lennon; Frederick W. Mesinger; Harold R. Swanton; Arlen G. Swiger; and Odbert P. Wilson.

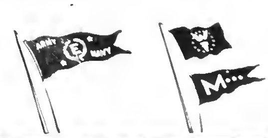
"Who's going ashore with the pilot?"

"He's a radio inspector. He often comes out here as far as the lightship to calibrate Radio Direction-Finders. The pilot's boat will put him ashore somewhere tomorrow."

As a part of Radiomarine's ship-radio station service, an experienced radio maintenance engineer frequently goes to sea with the ship to calibrate its Radiomarine Direction-Finder. He leaves with the pilot, often braving even severe storms to get ashore for his next ship.

These Radiomarine maintenance men are available day or night on the American Coastline, on the shores of the Great Lakes, on the Mississippi River, to make emergency repairs. And when overseas, a ship with a Radiomarine ship-station is assured the same quick, efficient emergency service from leading foreign communications systems.

The entire facilities of Radiomarine Corporation of America including its service stations at 21 ports are totally mobilized for war and are engaged in equipping merchant ships and the ships of our armed forces with complex radio-electronic installations required in fighting a global war . . . When victory is ours, the improved radio-electronic equipment developed for this purpose will be made available for all vessels—from pleasure craft to luxury liners. Radiomarine Corporation of America, 75 Varick Street, New York, N. Y.



RCA RADIOMARINE CORPORATION OF AMERICA

A SERVICE OF RADIO CORPORATION OF AMERICA

DIESEL MANUFACTURERS OF WEST COAST MEET

Standing, left to right: E. B. Scott, sales manager, Enterprise Engine & Foundry Co.; W. P. Wooldridge, general sales manager, diesel division, Joshua Hendy Iron Works; Howard Oxsen, sales manager, disel division, Fairbanks, Morse & Co.; Charles G. Cox, vice president, Enterprise; D. R. Lain, advertising manager, Union Diesel Engine Co.; seated, left to right: Gerald Brusher, sales engineer, Enterprise; Roy F. Anderson, Lorimer Diesel Engine Co.; W. M. Griffith, sales manager, Atlas Imperial Diesel Engine Co.; Harold D. Ellis, Diesel Engine Manufacturers Association; Roger Murray, branch manager, Fairbanks, Morse; G. F. Twist, vice president, Atlas Imperial.

California Diesel Builders Interested in Export

Importance of the position the San Francisco Bay area occupies in the diesel engine industry was revealed when the engine manufacturers gathered, July 14 in San Fraancisco's Palace Hotel, to meet Harold D. Ellis of Chicago, secretary of the National Diesel Engine Manufacturers Association. He reported that upwards of half a million horsepower, to the value of $50,000,000, was produced last year, it was brought out, with the production rate constantly mounting and a bright post-war picture in the offing.

Charles G. Cox, vice president of Enterprise Engine & Foundry Company, San Francisco, was one of six spokesmen for the manufacturers, who summarized the diesel situation in his section. There has been a tenfold increase in horsepower output since the war began, Mr. Cox said, many more engine models now being produced than before. Moreover, the industry faces no reconversion problem since its product was never changed materially for war purposes.

An excellent opportunity awaits the San Francisco Bay area in the export field, Mr. Cox added, being in favorable geographical position to supply diesel engines to foreign countries which will sorely need them in their post-war rehabilitation work.

Enterprise itself has manufactured better than one engine per day during the past twelve months, its yearly volume exceeding $20,000,000.

G. F. Twist, vice president of the Atlas Imperial Diesel Engine Company, Oakland, stated that before the war his company's engines were in every country in the world and that Atlas was a pioneer in diesel engine manufacture. Naturally Atlas, contribution to the war effort has changed the company's distribution picture, but Mr. Twist indicated it will be heard from in post-war markets.

Fairbanks, Morse & Company's history, from the time it made its first scale in 1830 to the present when it plans to produce post-war mainline locomotives, was related by R. M. Murray. Horsepower range in the company's engines, which comprise both marine and stationary models, is from 10 to 2000, Mr. Murray added.

Speaking for a newcomer in the diesel engine industry, was W. P. Wooldridge, assistant general manager of sales for Joshua Hendy Iron Works. The company only recently acquired its first contract for diesels after having operated an experimental engine for a year.

Roy F. Anderson, partner of Lorimer Diesel Engine Company, remarked that all of the principals in his company learned the business in the Bay area. Lorimer's first engine, built to run the plant, was bought by a customer.

D. R. Lain of Union Diesel Engine Company reported that except for a few fishing boat installations the company's wartime production had gone entirely to the Maritime Commission. Mr. Lain commended the spirit of the diesel manufacturers' meeting, stating that a united industry can accomplish more than a disunited one.

Not at the meeting, but a current visitor to San Francisco, Ralph Kelly, president of Baldwin Locomotive Works, states that a large item in his company's war shipping record, and an important item in its post-war export program, is diesel switch engines. More than 200 have been shipped to the war fronts, and it is expected that every country in the world will prove to be a market for them. A peculiarity of this business is that all countries do not have the same gage railways. They have found as many as eight different standards. American standard gage is 4 ft. 8½ in. In India the gage is 5 ft. 6 in. In Russia 5 ft., while in Australia there are five different gages for the various sections of the country.

APPOINTMENT

Williams, Dimond Company announce appointment of Reed Nichols as operating manager, replacing Hiram V. Walker, who left to become port representative in Honolulu for the War Shipping Administration.

Andrew "Andy" P. Hall

Meet Our Associate Editor!

Pacific Marine Review takes extreme pleasure in introducing our new Associate Editor, Andrew P. Hall!

Added to his background of practical shipbuilding experience in his native Scotland, Andy has a record of many active years in shipyards and naval architect offices on both American coasts. He has been an up-and-coming figure around the Bay Area for considerable time, and a host of friends identified with designing and building merchant and Navy ships under the war program will wish him well in his new editorial work.

He was born in the cradle of steel shipbuilding at Clydebank. Naturally he decided on shipbuilding as his career, and received his education at the local high school, the Technical College, Glasgow, and the University of California.

His experience as draftsman, naval architect and supervisor of repairs was acquired on every type of ship, from a small yacht to the largest of modern passenger liners, and from a landing barge to the latest type battleship.

For the past twenty-odd years he has lived on the Pacific Coast. For a considerable number of years he was engaged in the field of technical education and taught ship drafting, naval architecture and practical shipbuilding for Tamalpais High School and the University of California. For the past two and a half years he has been connected with the office of Captain C. O. Kell, (CC), USN, Supervisor of Shipbuilding, San Francisco.

Announcement

The Baldw[illegible] [illegible]ive Works recently announ[illegible] Frank K. Metzger, former [illegible] vice president of Standard St[illegible] Works Division, has been elected vice president in charge of sales of the firm.

John D. Tyson, of the Standard Steel Works staff, has been elected vice president in charge of that division.

John M. Noble of Walter Kidde & Co.

Kidde Aquires Ingas

Purchase of the business assets and good will of the U. S. Fire Protection Company, makers of Ingas gas-generating systems, formerly of Hoboken and Milwaukee, is announced by Walter Kidde & Company, Belleville, N. J., pioneers in carbon dioxide equipment. Present government contracts will be fulfilled by Kidde. Interesting new applications for post-war use will be developed through the redesigning of the device to combat hazardous conditions in many manufacturing and processing industries where flammable materials, combined with vapors or dust, are of a combustible nature and highly explosive.

Walter Kidde & Company, Belleville, N. J., announces the opening of a new sales and engineering office at 9507 Santa Monica Boulevard, Beverly Hills, California. John M. Noble, who for the last four years has been manager of the Aviation Department at Kidde, has been appointed district manager in charge of the new West Coast office.

Mr. Noble was formerly manager of the Flight Instruments Department and assistant to the manager of the Friez division of Bendix Aviation Corporation, Baltimore, Md. In that work he was concerned with the engineering, sale and production of flight and recording equipment used for research and routine operations by the armed services and scheduled airlines. Other Friez products with which he was concerned were recording instruments used in weather research for aviation applications.

Lieutenant C. R. Siversen, son of "Louie" Louis K. Siversen, the head of Columbia Machine Works, Berkeley, California. The young Army airman, returning from action "out West," was a recent guest at The Mariner's Club in San Francisco. The decorations are eloquent evidence that there was plenty of action.

KEEP POSTED

A New Basic Resin

The U. S. Stoneware Company of Akron, Ohio, announces the current availability for limited commercial and experimental use of a new resin, named Duralon, a furane derivative, characterized by the lowest water absorption of any organic resin; insolubility (after activation) in any solvent or combination of solvents; high electrical resistivity; absolute stability in storage and handling; and ease of workability.

This resin, in its pure form, is a heavy, viscous liquid, dark maroon in color. On incorporation of catalysts and application of mild heat, Duralon reverts to an extremly hard, dense, black substance. Varying physical, chemical and electrical properties can be developed in the base resin by incorporation of the usual fillers and lubricants. In certain stages Duralon can be readily machined by drilling, milling, turning, sanding or grinding.

Duralon resins are readily soluble, before activation, in many inexpensive hydrocarbons, as well as in ketones and chlorinated solvents. Its paramount immediate importance is as an impregnant, as a laminating and bonding agent, or as a protective coating material.

Duralon coatings may be applied by any of the conventional processes, or it may be used for impregnation of porous materials, or as a bonding agent for abrasive compounds and powdered metals, or for adhesive bonding of fibrous materials to each other.

Prior to the application of heat, Duralon coatings are soft and flexible. As heat is applied (a mild bake is usually sufficient), the coatings remain thermoplastic up to a point, at which time they become increasingly thermosetting, depending upon the type and extent of activation.

Duralon coatings, after baking, are hard, and while somewhat more brittle than coatings of the thermoplastic type, show excellent abrasion resistance and utter lack of aging characteristics. Such coatings show practically zero water absorption, are unaffected by any solvent, possess excellent resistance to all non-oxidizing acids, and good resistance to alkaline materials.

Shipping Personalities

Ashore & Afloat

Ernest J. Bradley, who served in the San Francisco headquarters of the War Shipping Administration since the outbreak of the war and then was assigned to England, played an important part in supervising merchant shipping for the D Day Normandy invasion, as regional director for the United Kingdom.

At present Mr. Bradley is on leave from the Matson Navigation Company's operating department.

Captain Robert R. Drummond, well known up and down the Pacific Coast, succeeded Captain J. W. Fowler as port captain at Marinship Corporation. The latter was recently named San Francisco Bar Pilot succeeding to the vacancy on the Bar Pilot force created by the recent death of Captain Pierce.

Captain Drummond was at one time Chief Officer with the old Los Angeles Steamship Company and also was skipper on vessels of the Flood Bros. fleet.

George Gronvold, formerly chief engineer on the Matsonia and who now is Lieutenant Commander aboard a ship in Atlantic service, was in San Francisco on shore leave recently. Another Chief Engineer of Matson in the service is **Milton G. Gildersleeve,** who is aboard a ship in the South Pacific with the rank of Lieutenant Commander. A Matson skipper stationed at Port Hueneme is **H. W. Heuer,** formerly skipper on the SS Hawaiian Shipper, who is now a Navy Commander.

Promotion of **C. W. Lowith** to the rank of Lieutenant Commander was the news reaching his San Francisco shipping friends. One of the best-known marine engineers sailing the Pacific, Lt. Comdr. Lowith was formerly chief engineer on vessels of the Matson Company. He has been in the Navy for more than four years, and is to be found in the Puget Sound Area.

He saw service in the South Pacific and also in Alaska in the earlier periods when the Japs "had their own way," and was in charge of the engine room of a vessel that participated in two battles in the Pacific.

A year ago he was ordered to Washington, after hospitalization at Oak Knoll, where he has been serving with the Bureau of Ships and Docks.

Notice

American seamen, effective November 15, will not be able to ship out of the United States to a foreign port without a passport. By August 15, the State Department's announcement said, seamen must have either a passport or evidence they applied for one within the preceding six months. It is a precautionary measure to safeguard the merchant marine.

William H. Thomas is the chief engineer on the China Victory, which is under Matson Company operation. He has been with Matson continuously since 1917, with a break-in to serve in the first war with the Transport Service, after which he returned to Matson.

Samuel D. Schell, executive director for the Maritime Commission, has been named executive deputy administrator for the War Shipping Administration. He is one of the veterans in Government shipping, having joined the Shipping Board in World War I.

Maritime "M" Flag To R. M. Wade Co.

A recent telegram from Rear Admiral H. L. Vickery, as chairman of the U. S. Maritime Commission Board of Awards, announced to the management of R. M. Wade Co. of Portland, Oregon, and its subsidiary, the Multnomah Iron Works, that both firms are to be awarded the Maritime "M" flag in ceremonies to be held prior to August 7.

The two firms have been engaged in the production of many component parts used in the fabrication of airplane carriers built at the Kaiser Company Vancouver yards. At present they are engaged in manufacturing many items used in the construction of tankers, including the Victory type AV-1 and the type BD-1 ships being built on the Pacific Coast by the Maritime Commission.

Busmen's Holiday! Five leaders of the Pacific Coast's booming shipbuilding industry take a day off . . . to attend a ship launching! Left to right: K. K. Bechtel, president, Marinship; S. D. Bechtel, chairman of the board, California Shipbuilding Corp.; Felix Kahn, vice president, Joshua Hendy Iron Works; Edgar Kaiser, vice president and general manager, Oregon Shipbuilding Co. and the Kaiser Co., Inc., yards at Swan Island and Vancouver, Wash.; and, Henry J. Kaiser, president of Kaiser Co., Inc. and Permanente Metals Corp. yards at Richmond, Calif.

F. S. Hodgman, USNR, retired, manager of the Marine Division of Sperry Gyroscope Company, receiving a diamond pin marking the completion of 25 years with the company. Here P. R. Bassett, left, vice president and general manager of the company, awards the emblem to the man widely known for outstanding contributions in the development of the gyro-pilot for ships and aircraft.

Department of Romance Steel and Shipbuilding Engagement

Mr. and Mrs. John Roach Sproul of Philadelphia announced the engagement of their daughter, Miss Caroline Sproul, to Lieutenant Blaine F. Fairless, USNR, son of Benjamin F. Fairless, president of U. S. Steel Corporation.

Miss Sproul is the granddaughter of the late William Cameron Sproul, former governor of Pennsylvania, and granddaughter of Dr. H. D. Hatfield, former governor of West Virginia and former U. S. Senator from the same state. She is also the great-great granddaughter of John Roach, founder of the Roach Shipyards, Chester, Pa., who in 1883 contracted to build the first steel ships in America for the U. S. Navy. She is a graduate of the Shipley School, Bryn Mawr, Pa.

Lt. Fairless was educated at Culver Military Academy and after graduation from Massachusetts Institute of Technology attended the Babson School of Business Administration in Boston. Lt. Fairless has been on active duty in the South Pacific for a year. No date has been set for the wedding, but it is expected to take place in the near future.

Keep Posted—continued

Ventilator Motor Cooled by Fan Air

A motor for ship ventilators which fits inside the duct, thus saving valuable deck space, and cools itself by the air displaced by the fan, has recently been developed by the Westinghouse Electric & Manufacturing Company.

Ventilator motor cooled by fan air.

The motor frame serves a double purpose. First, it supports and centers the motor in the duct. Second, the supports are shaped like air-foil vanes, straightening the air-flow in the duct. This lessens the turbulence in the air, resulting in higher efficiency and quieter operation of the blower. The grease pipes and motor leads are brought through one of the vanes, thus eliminating an obstruction that often increases losses and excessive noise.

Rust, Dust, Saboteurs Barred From Tubing

Protection against dirt, tampering and rust for aircraft tubing and hex nuts is being achieved in Western plants through the application of Cel-O-Seal, a du Pont product whose principal use has been in commercial closures.

Cel-O-Seal caps are head closures of non-fibrous pure cellulose. No metal is used in their manufacture. Closure specialists of the I. F. Schnier Company, Western distributors for du Pont Cel-O-Seals and Wind-O-Bands, report successful use of the product over threaded or plain tube ends and over hex nuts threaded to tube ends. Applied quickly by hand (20-25 a minute is average time), the closures shrink in drying, conforming to the contours over which they are placed.

Cel-O-Seal caps.

Anti-sabotage production is another important element in the use of this product. The reopening of a once-sealed tube is a signal to plant inspectors of tampering. Specifications of the seals vary to suit the particular needs of the application.

The I. F. Schnier Company maintains home offices in San Francisco and branch offices in Los Angeles.

Left, David Neilson, principal hull inspector with Herbert A. Crawford, yard superintendent of Bethlehem-Alameda Shipyard shown on the bridge of the troop transport, U.S.S. Admiral W. S. Benson.

Victor Opens New Oakland Store

Victor Equipment Company, with plant and executive offices at 844 Folsom Street, San Francisco 7, anounces the opening of its Oakland sales and service store as of September 1, 1944.

The great industrial progress made by East Bay cities has made this retail store a long-desired necessity. While the company continues to make bulk deliveries directly from San Francisco, this newly-opened store facilitates emergency shipments and repair services. It will also be a great convenience to East Bay purchasers in the personal selection of gas and electric welding equipment and supplies.

Victor's new Oakland store, to be opened September 1, is conveniently located at 312 12th Street (Zone 7). E. L. Russell, veteran Victor service engineer, has been named branch manager.

Fairbanks, Morse Man Visits Coast

V. O. Harkness, manager diesel sales division, Fairbank's Morse & Company, Chicago, was in San Francisco the latter part of July on an inspection and get-acquainted trip that is taking him to shipyards and fishing fleets from San Diego to Vancouver, B. C.

This is his first trip to the Pacific Coast and he expressed much enthusiasm about the fishing fleets, the Tuna Clipper fleets at San Diego and San Pedro, the Sardine fleets at Monterey, and while he had not yet seen them, he hoped to get as big a thrill out of the halibut and salmon fleets in the Northwest.

The main object of his inspection and get-acquainted tour was to get a clear picture of post-war requirements, to note the trends, and learn just what kind of equipment will be needed in the future by the fishing industry. He was also interested in the possibility of conversion of cargo ships from steam to diesel-drive in the post-war reconversion period.

Mr. Harkness spent a week in San Francisco visiting the fishing fleets and shipyards with Roger M. Murray, San Francisco branch manager, and Howard Oxsen, diesel department manager, San Francisco.

Fairbanks, Morse executives in discussion of post-war prospects for diesel engine sales on the Pacific Coast. Left to right: V. O. Harkness, on visit from Chicago; Roger M. Murray, San Francisco branch manager; and, Howard Oxsen, manager of diesel department, San Francisco branch.

Keep Posted—continued

Chrome Plate Piston Rings

Recent removal of censorship restrictions has permitted the release by the American Hammered Piston Ring Division of Koppers Co. of an outstanding example of the "tremendous trifles" which are playing such an important part in American war successes.

By plating airplane piston rings with .005″ of chromium (about the thickness of a sheet of book paper) on the cylinder contacting surface, our fighting aircraft have been able to fly five times as many hours between engine overhauls, even in Africa, where the abrasive-like dust of the desert apparently has no ceiling.

Tightly locked on special arbors, the piston rings are lowered by an overhead traveling crane into one of a long series of tanks. Said to be carried out in the largest chromium plating department in the world, the operation is based upon the Van der Horst Process, which American Hammered pioneered in this country. While experimental work pre-dates the war, the present department, with its block-long line of plating tanks and generators, was planned immediately following Pearl Harbor, and has been in actual operation for over a year.

The "chrome" on airplane rings is not the bright, hard plating used on automobile bumpers. Instead, it is known as "Porus-Krome"—gentle on cylinder walls, permitting ample lubrication and yet resisting wear to an extent that, if applied to industrial engines in post-war days, has long-life potentialities beyond any piston ring set-up ever known in the trade.

Navy Mobile X-Ray Unit

The U. S. Navy acts on the theory that nine-tenths of all lung disorder problems can be solved if discovered early. To facilitate periodic lung examinations, Westinghouse engineers have designed a complete X-ray laboratory to go in a three-ton truck. It can be drawn up quickly at a dock to meet an incoming ship or can be driven to a naval training station for photofluorographic examination of the men.

This three-ton truck has all the necessary facilities for exposing and processing 35-mm X-ray films. The power supply can be a-c or d-c, and a 100-foot reel of cable is provided for making connections. The truck has a complete photographic darkroom, including an automatic refrigerated temperature-controlled film-processing tank. There is a heater to warm the truck in cold weather. A synchronous converter and other auxiliary equipment facilitate the smooth, rapid handling of patients. As many as 600 patients have been X-rayed in a single day, and this number can be increased if necessary.

Westinghouse photofluoroscope taking picture of seaman's lungs.

Newly Appointed Sales Manager

The Los Angeles Steel Casting Company announces the appointment of Ralph A. Lewis as sales manager for the company.

Mr. Lewis has a background of some twenty years experience in the foundry industry of Southern California and has been a member of the Los Angeles Steel Casting Company staff for the past twelve years.

During this time he has served as a sales manager, specializing in the application of steel castings to the petroleum industry. He is well versed in the requirements of the drilling, production and refining divisions of the industry.

The Los Angeles Steel Casting Company has an outstanding production record having been awarded the Maritime "M" Pennant for its contribution to the shipbuilding program.

Production methods and metallurgical practices developed under war time conditions will be adapted to the peace time requirements of Southern California industry.

Nelson to Head Terminal Group

The Northwest Marine Terminal Association, composed of terminal operators subject to the Shipping Act of 1916, has announced the election of J. D. Nelson, freight traffic manager of the Alaska Steamship Company, to the post of president.

Other officers selected at the association's recent annual meeting are: Vice President, F. G. Pender, manager of the Port of Vancouver, Wash.; Treasurer, A. J. Bacon, manager of the Salmon Terminals of Seattle. W. F. Varnell was re-elected executive secretary.

The following trustees also were chosen:

C. E. Bailey, manager of the Commission of Public Docks, Portland, Oregon; C. E. Collins, district manager of the McCormick Steamship Co., Portland; W. R. Sexton, Jr., manager of the Columbia Basin Terminals, Portland; George W. Osgood, manager of the Port of Tacoma; Col. W. C. Bickford, general manager and chief engineer of the Port of Seattle; Harry Isler, manager of the Port of Bellingham; W. J. Murphy, manager of the Port of Grays Harbor, and F. G. Pender, manager of the Port of Vancouver, Wash.

Tait Stevedoring Co. Names Assistant Manager

Charles Tait, president of the Tait Stevedoring Co. of Seattle, has appointed Fred A. Haynes as assistant general manager.

Mr. Haynes was formerly traffic manager for the Siems Drake-Puget Sound Company for five years and prior to that time was traffic manager for Ford's Ships.

The Tait firm has recently taken over a Seattle dock which is handling cargo for the Seattle Port of Embarkation. Leonard Cooperman, former terminal superintendent for the Matson Navigation Co. and the Pacific Steamship Co., will be terminal superintendent at the new facility.

Valve Magnate

Edmund H. Lunken, Chairman of the Board of The Lunkenheimer Company, Cincinnati, Ohio, valve manufactuerers, died Wednesday, July 19, at his summer home in Michigan, as the result of a cerebral hemorrhage.

Mr. Lunken, who was 83 years old, had been active and in good health until last winter, when he suffered an attack of influenza.

The son of Frederick Lunkenheimer, founder of The Lunkenheimer Company, he was born in Cincinnati and educated in the Cincinnati schools. At the age of 16 he entered his father's business, which had been established in 1862. Upon the death of his father in 1889, he assumed leadership of the company and remained its senior officer until his death. In 1892, he legally changed his surname to Lunken, but did not change the name of the company.

Bethlehem Steel Elects H. H. Fuller

H. H. Fuller has been elected vice president in charge of West Coast steel activities of Bethlehem Steel Co., effective July 1, according to an announcement from E. G. Grace, president of the company.

Mr. Fuller succeeds W. H. Stewart, who has held the office for the past 12 years. Mr. Stewart, though retiring from active duty, will continue in an advisory and consulting capacity.

Mr. Fuller entered the employ of the company at the close of the first world war, and in 1936 became assistant manager of sales for the New York district, and two years later was appointed district sales manager.

The West Coast headquarters of the company is at 20th and Illinois Streets, San Francisco.

French Goes With Plywood Company

George French, formerly in charge of the woodworking department of the Western Electric Company, has become associated with the United States Plywood Corporation as production engineer.

A member of the executive committee of the wood industries division of the American Society of Mechanical Engineers, Mr. French has done industrial research for U. S. Forest Products Laboratories, and was a consulting engineer for the Nation Lumber Manufacturers Association.

OBIT

Edgar Ames Passes Away

Edgar Ames, former Seattle shipbuilder and long president in Pacific Coast industry, died June 28 in a Seattle hospital at the age of 76.

Born in St. Louis, Mo., in 1868, Mr. Ames was graduated from Yale and began his career as a rodman with the Cedar Rapids & Manchester Railroad, later serving as assistant city engineer of Cedar Rapids.

He came to Seattle in 1894 and was engaged in harbor improvements for the city from 1895 until 1915. Largely responsible for one of the great projects in the development of the Puget Sound city, Mr. Ames directed the filling in of the tideflats below Beacon Hill. He was president of the Ames Shipbuilding Co., the Puyallup Dredging Co. and director of the Ames Realty Co.

During the first world war Mr. Ames built 25 steel ships for the United States Government. He was a member of the Society of Naval Architects and Marine Engineers, Psi Upsilon fraternity and the New York University Club. In 1909 he married Ann Shaw Sheldon of Portland, Oregon. Besides his widow he is survived by one daughter, Mrs. John A. Baillargeon of Seattle.

Seamen's Hospitality House In San Francisco

Seamen in San Francisco now have a hospitality house, the first of its kind in this port. It is exclusively for the Merchant Marine and is located at 439 Market Street, as central a location as could be secured to serve men arriving or awaiting to leave from piers south and north of the Ferry Building. It is a unit of the worldwide United Seamen's Service.

The headquarters is furnished for recreation with a snack bar, library, telephones, writing desk, information desk and game rooms.

★ ★ ★ *How* ★ ★ ★

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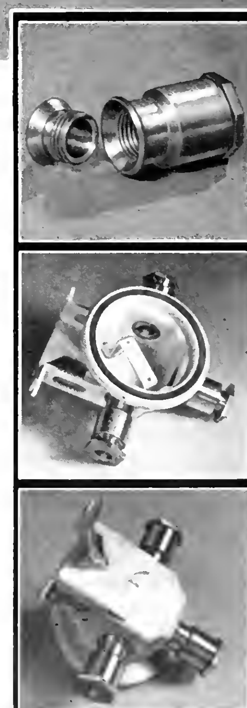

NO WELDING is required to install the COMAR Electrical Terminal Tube. Just a few turns of a wrench provides an Air Tight, Water Tight, Gas Proof joint which is not affected by vibration or temperature changes. — Used almost exclusively on naval vessels, COMAR Terminal Tubes appeal instantly to all ship builders when they figure installation time savings by eliminating welding, plus real quality and permanent efficiency. — Compare 3½ minutes shipboard installation against 18 to 20 minutes for a Navy Type 9-S welded tube, then write or telephone for all details and prices.

At right, the plug with male bevel, seals against the female flange to provide a water-tight joint. Notice flush interior.

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Time Delay Relay

The new Cramer type TDSA and TDSB time delay relay has been designed to provide a definitely varied operation of one circuit in relation to the second circuit. It is arranged for surface mounting for either front or rear connections and is especially designed to withstand momentary shock conditions. It is made by The R. W. Cramer Company, Inc., Centerbrook, Conn.

Quints born with "M" blazes to "Millie," the hard-working Maltese cat, at the Portland Terminal of the McCormick Steamship Division of Pope & Talbot, Inc.

Recent Contracts

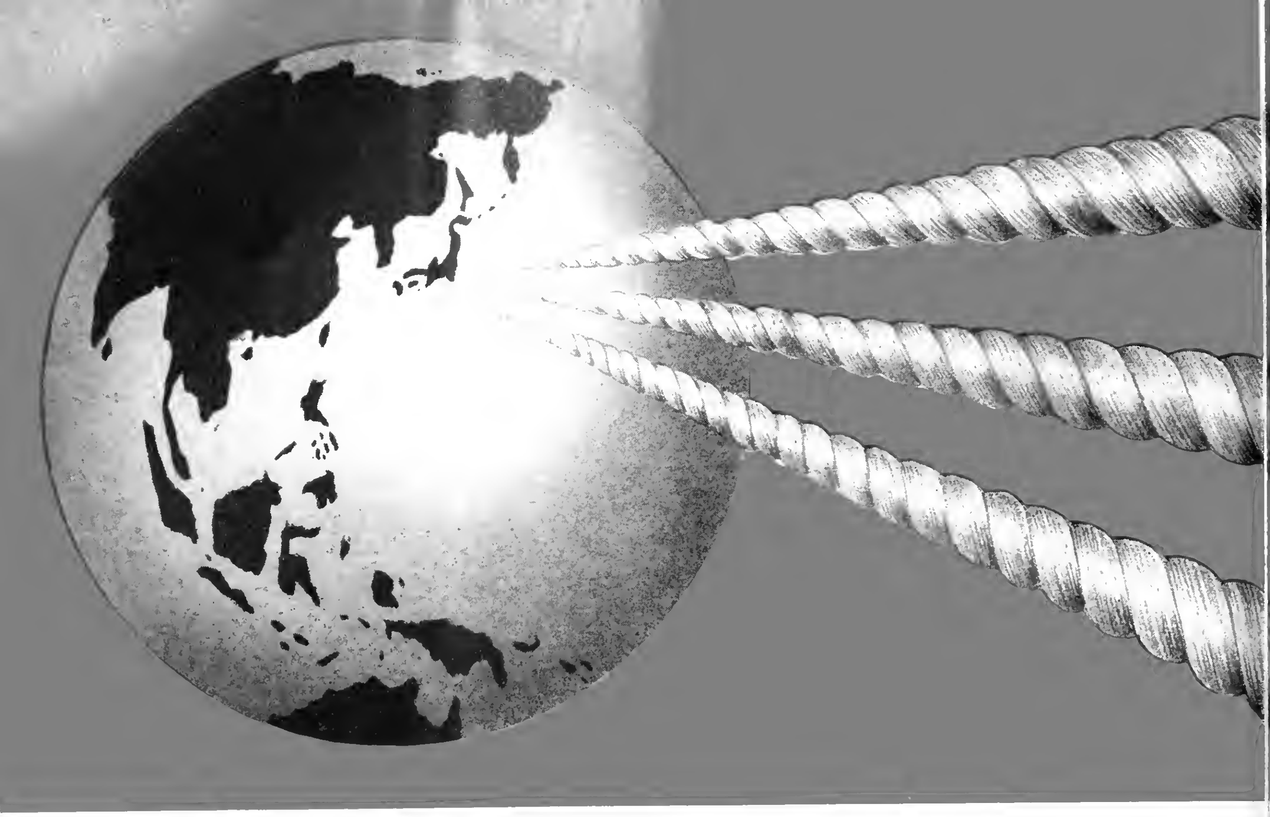
On July 6 the U. S. Maritime Commission appointed Joslyn and Ryan, naval architects and marine engineers of San Francisco, the design agents for new tankers of 30,000 barrel capacity.

A contract for 20 of these ships, known as B.T.I.'s, has been awarded to the St. John Shipbuilding Company, Jacksonville, Florida. Twelve more are to be built by Todd Shipyards Corp., Houston, Texas, and the Jones Shipbuilding Company, Panama City, Florida. These 12 will be operated under lend-lease by the British War Shipping Administration.

Joslyn and Ryan are also the design agents for a smaller type ocean-going tanker, known as the B.K.-type. Thirty-two of these ships are to be built under the supervision of the U. S. Maritime Commission.

Pacific Marine Review

SEPTEMBER
1944



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That's why it's **your** job—along with the many other things you are doing to aid the war—to conserve rope in every way possible. The care of rope is a precious war asset.

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Manila Rope
...helps the Fighting French Get Across!
● To build a ponton bridge, you begin by getting a length of rope to the bank beyond. Throughout the construction, rope is an indispensable aid. And when the bridge is finished, rope is still much in evidence.
The photo shows French troops crossing the Volturno River in Italy, on their way to settle a score with the despoilers of their country, pending since the French-German armistice of 1940. Notice that each ponton is anchored with rope, and further secured by another rope laid parallel above the bridge.
Wherever our fighting men go, rope goes with them. That's why you may not at times be able to buy all the rope you want. And that's why the rope that you do have should be handled with the utmost care, for
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Pacific Marine Review

A Tribute to American Ship Operators

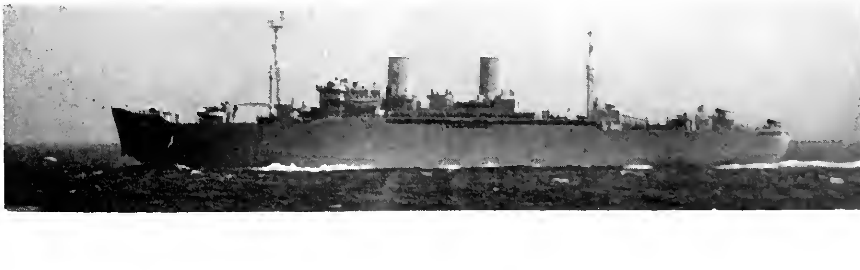
Victory Fleet Day, September 27, he third anniversary of the birth f the wartime merchant fleet, is edicated to the shipping companies f the United States who have main- ained the global life lines of a na- ion at war.

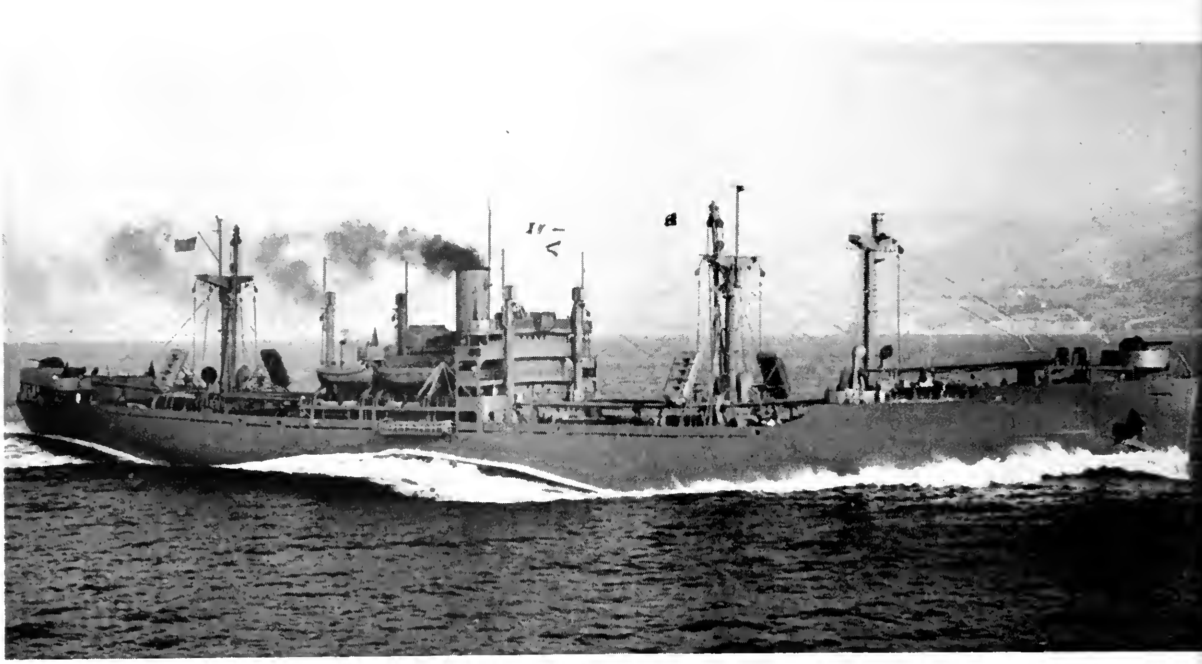
The War Shipping Administration as directed that this year's celebra- ion be in honor of the American ag lines' successful accomplishment f the most complex and most dan- erous transportation task in his- ory.

Three years ago, on September 27, 941, the first Liberty ships were unched at various Pacific and At- ntic Coast yards, the forerunner of thousands of vessels under the U. S. Maritime Commission's emergency building program. Today there are over 3400 vessels—Liberty ships, tankers, the standard C-type vessels and other ships—under control of the War Shipping Administration and operated by the private shipping companies.

The United States had a maritime pattern established and in production when the second world war came. Its shipbuilders were launching fine modern fast cargo and passenger liners, tankers and freighters. These ships were being ably operated by the privately-owned American flag lines. It was this experienced management and seagoing personnel that enabled the lines to accept and fulfill the great task so suddenly thrust upon them by the war. Victory Fleet Day, it is hoped, will bring home to millions of Americans the significant fact that our enormous overseas merchant marine today is being operated not by the War Shipping Administration—which has only strategic control of shipping for duration of the war—but by private steamship companies.

It speaks well for the efficient organization and mature experience of the established American shipping companies that they were able not





only to lend scores of trained executives to various governmental agencies, but could thereafter organize themselves to handle fleets of from two to four times peacetime size. Fourteen of the largest shipping concerns whose combined fleets totaled 332 vessels in 1940 were operating 1067 ships by the summer of 1944. A typical veteran company, for instance, operating 202,000 deadweight tons in December, 1942, found itself handling over 825,000 deadweight tons of ships for WSA in April, 1944.

Impact of Total War

The total war that broke over us in December, 1941, compelled recognition of the merchant marine as of vital importance:

(1) For troop transport and maintenance.

(2) To continue essential lend-lease shipments.

(3) For bringing to this country vastly greater imports of war-essential raw materials.

(4) To replace shipping losses of other nations.

At once the shipbuilding program of the Maritime Commission was expanded to meet the wartime schedule —8,000,000 tons in 1942 and more than double that in 1943. Ships—mostly Libertys, but also including tankers and C1, C2, and C3 types (and in 1944 the new Victorys)—were delivered in steadily increasing numbers and were practically all allotted to the established shipping companies.

In 1943 there were 62,000,000 long tons of cargo moved out of the United States. The WSA points out that in this great movement of goods to all parts of the earth, despite the handicaps under which shipping companies were forced to operate, there has not been a single failure of shipment for any cause that could be ascribed to the operators, nor has there been an essential cargo left at the dock for lack of shipping space.

The specific responsibilities of ship operators in this war have been to see that the ships are kept sailing, loaded with cargo and with full and competent crews aboard. In their manning problems they have had great assistance from the maritime unions, and Training and Recruitment Organizations of WSA. WSA recognizes and appreciates the full support lent the vital recruitment programs by the press and radio facilities of the country at no cost to the Government. The stevedoring organizations and unions have cooperated fully and patriotically in cargo and loading problems. Over all these matters, however, there hovers the supervision of the operators, who, with reduced staffs, have frequently worked around the clock to smooth out and complete the numberless details that mean efficient operation.

All-Out for Victory

Commercial considerations, in the ordinary sense of the term, have been forgotten. Merchant shipping has become a branch of the armed services though it retains its civilian status. As such, merchant ships and seamen have had an essential part in the operations of the Allies, and so dangerous that personnel losses in '42 and '43 were proportionately higher than in the armed forces, and still are in mid-1944.

Operating problems were multiplied by many new factors .As the number of ships increased it became more difficult to find experienced men in sufficient number to man them. In spring of 1942 the submarine menace was at its height, and caused time-consuming, long and roundabout routes to avoid the enemy. As the submarine danger was reduced in 1943 and almost eliminated in 1944, an immense flow of goods started to England and the Mediterranean, placing terrific strain on existing port facilities. Port conditions would have been chaotic without the smooth arrangement of facilities worked out by the operators, WSA port authorities and the Office of Defense Transportation. Clocklike regularity has been achieved among such diversified factors as rail movements, warehousing and railroad car space, stevedoring and other loading facilities and the inevitable conflicts that occur in

shipping priorities. Committees of operators, port authorities and Government transportation executives see that schedules of land and water transportation are properly meshed with other factors to assure smooth operations. So effective have been their efforts that for months there has been maintained a 24-hour daily average of a sailing every 30 minutes of ships outward bound with the goods of war.

As D-Day approached, bringing enormous shipping requirements for invasion, ship operators took the lead in a concerted effort to reduce turnaround time. With WSA officials, stevedoring organizations and repair yards, the operators worked out a system whereby the turnaround was reduced materially. Incoming convoys were met by steamship company representatives, repair needs inventoried and the ships routed to alerted repair yards, where repairs were made in hours instead of days. Cargo schedules were tightened all the way through railroad yards, warehouses, and back to factories. Ship personnel cut shore leave. Stevedoring organizations stepped up their activity. The movement of cargoes was hastened to the extent that 3700 ship days a month—the equivalent of 123 additional ships—were added to the Atlantic run.

Victory Fleet Day, 1944, should remind America that in 1941, as in 1917, this country was thrust into a war of transport for which it was largely unprepared; that in 1942 and 1943, despite disruption of the national economy and at vast expense—much greater than the peacetime maintenance of an adequate merchant marine—miracles of shipbuilding and ship operation were performed and disaster averted. Victory Fleet Day should bring home too the fact that **a modern merchant marine is composed primarily of its shore and seagoing personnel, and secondarily of its ships. Furthermore, that without experienced, capable management to operate, man, provision and fuel our vessels and to supervise the intricate and difficult loading and discharge of cargoes, the United States could not have made its total war effort effective.**

The shipping companies have met the challenge of war with full patriotism and without fanfare. Theirs has been rather a prosaic job, taken for granted by the public, if thought of at all, because until very lately "reasons of security" have exerted a complete censorship ban on practically all news of the merchant marine. However, the proof of their work is in the regular world-wide arrivals of ships bearing essential supplies to our soldiers and our Allies. They are winning the Battle of Supply.

Victory Fleet Day will accent the fact that when peace comes the shipping companies, having proved their ability to handle under the most adverse conditions the vast world-wide commerce of war, will be supremely well-equipped to fulfill their part in their country's greatly expanded postwar foreign trade. Then the United States may bear witness to the truth of Admiral Alfred T. Mahan's famous axioms:

" . . . A nation's seaborne trade is the lifeblood of its power, the assurer of its credit, the purveyor of its comfort.

"Internationally considered, ships and cargoes are the national wealth engaged in reproducing and multiplying itself to the intensification of the national power, and that by the most effective process . . .

"Commercial enterprise is never so secure, nor so untrammeled, as under its own flag."

(Official U. S. Navy photo)

Above: A view taken from the bridges looking forward.

Left: A successful trial —"a clean sweep"— hoisting the broom.

Coastal

KAISER CARGO INC. Yard No. 4 at Richmond, California, have delivered their first C1-M-AV1 coastal cargo motorship to the U. S. Maritime Commission after successful sea trials.

The Commission has issued contracts for 200 or more of these vessels in the largest motorship-building program ever undertaken. Many of these vessels are building in Great Lakes yards and some on the Gulf Coast. On the Pacific Coast there are 69 under order, with 57 going to Consolidated Steel Corporation at Wilmington, California; 12 to Kaiser Cargo Inc. at Richmond No. 4 yard.

The hull of this vessel is an all welded steel structure. The general characteristics are shown below:

Light displacement (max.)	2400 tons
Deadweight capacity	3840 tons
Cubic capacity (bales)	232,000
Cubic refrigeration capacity	10,000 cu. ft.
Liquid cargo capacity	487 tons
Length, overall	338 ft. 8⅜ in.
Length, b.p.	320 ft. 0 in.
Breadth, molded	50 ft. 0 in.
Depth, molded	29 ft. 0 in.
Loaded draft (mean)	18 ft. 0 in.
Shaft horsepower (normal)	1700
Shaft horsepower (maximum)	2000
Fresh water capacity	70 tons
Fuel capacity	349 tons
Total weight of engine room machinery	215½ tons
Length of engine room	51¾ ft.
Number of passengers carried	None
Winches (number and power)	16
Total number of ship's crew and officers	63
Daily full power fuel consumption	7½ tons
Port fuel consumption (idle)	2 tons
Port fuel consumption (winches and cargo pumps working)	3 tons

The hull has a raked bow and a cruiser stern and is fitted for single screw propulsion with machinery aft. The main deck and a second deck are complete steel decks from stem to stern, with suitable openings for cargo and machinery hatches. As shown in the inboard profile, the double bottom extends from the forepeak bulkhead to the after peak bulkhead. Six watertight bulkheads extend from the double bottom tank tops to the main deck, dividing the hull into seven watertight compartments. From forward aft these compartments are: forepeak and bos'un's

Motorship Type C1-M-AV1

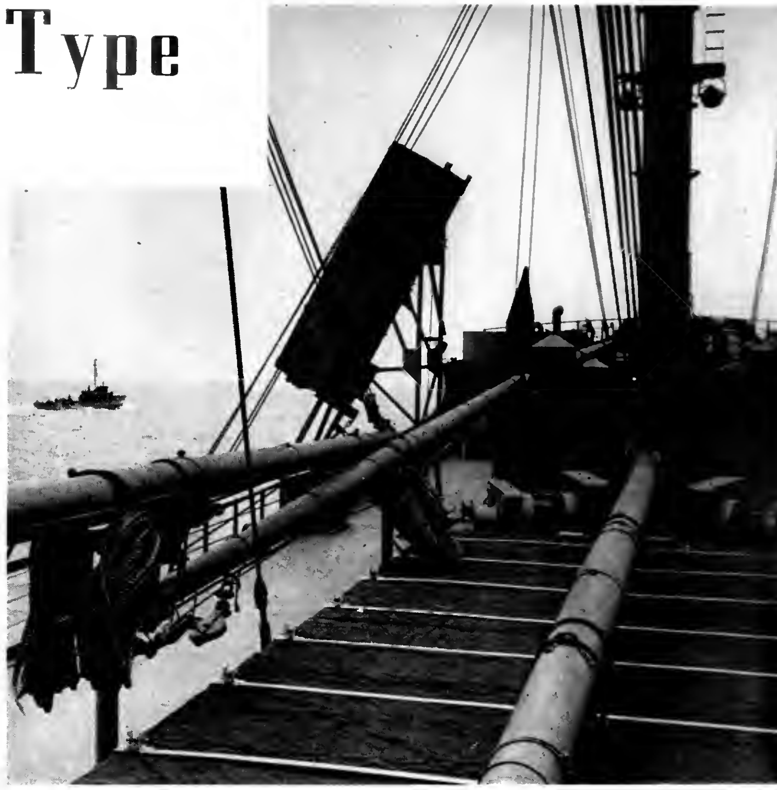
stores; No. 1 'tween decks and No. 1 hold; No. 2 'tween decks and No. 2 hold; No. 3 'tween decks and No. 3 hold; machinery space; refrigerated cargo and ship's stores; and afterpeak and steering gear. Under the second deck at the forward end of hold No. 1 are two oiltight bulkheads forming a fuel oil or liquid ballast tank of large capacity.

The main deck erections consist of a short forecastle deck and a long poop deck. On the forward end of the poop deck is a superstructure for captain's quarters, wheelhouse and bridge. The main deck under the poop houses all the engineer officers, the crew, the gun crew, the petty officers' mess and the crew's mess. The deck officers' and the officers' mess are on the poop deck in the superstructure house.

Deck Machinery

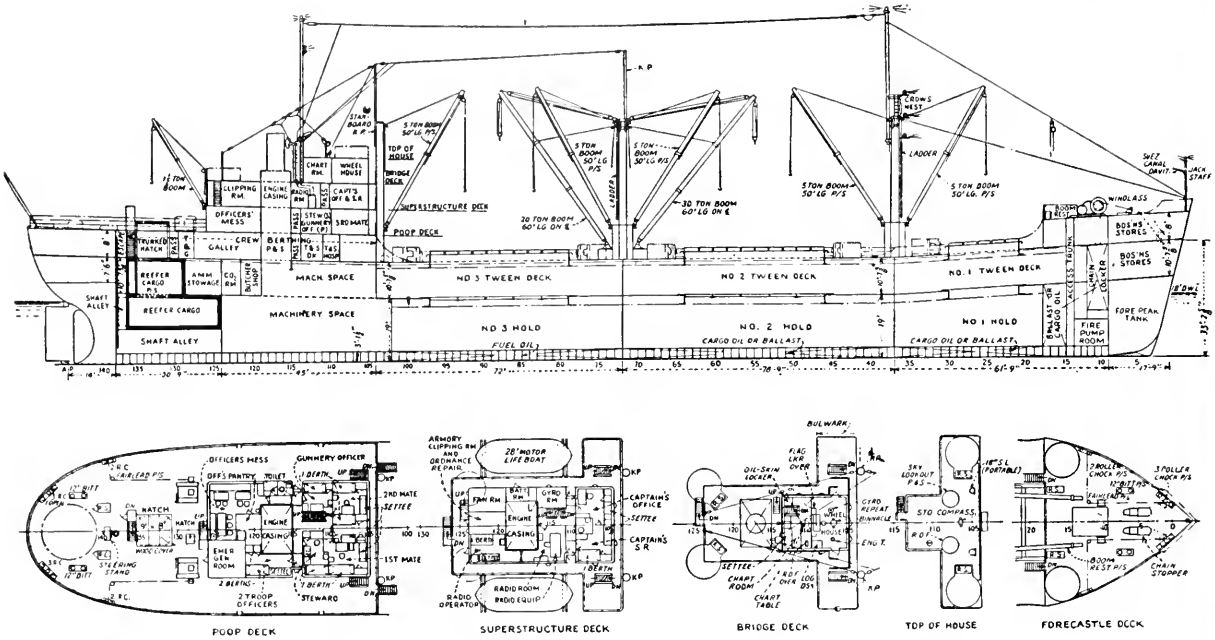
One of the remarkable features of this Coaster is the extraordinary provision of cargo-handling equipment for a vessel of this size and capacity. The three main cargo hatches forward of the machinery space are served by ten 5-ton booms, one 20-ton boom and one 30-ton boom. A single steel mast between hatch No. 1 and hatch No. 2 supports four 5-ton booms. A similar mast between No. 2 and No. 3 hatches supports four 5-ton booms and the two heavy booms. A king post, port and starboard, on the forward end of poop supports a five-ton boom. Arrangement of these masts and booms is shown on the deck plans. Between No. 1 and No. 2 hatches there are four cargo winches, one for each boom. Between No. 2 and No. 3 there are eight cargo winches, or two for each 5-ton boom or four for each heavy boom, if heavy booms are in use. Between No. 3 hatch and the break of the poop are two winches, one for each 5-ton boom. In addition, there are two king posts each with a 1½-ton boom, and two winches on the poop deck aft of the superstructure to serve the refrigerated cargo space and ship stores. These winches are the standard U.S.M.C. Unit-type cargo winch made by Webster-Brinkley of Seattle, Washington, and equipped with 50-hp General Electric motors and controls.

This coastal motorship has as many and as powerful cargo winches as are installed on the standard C-3's to

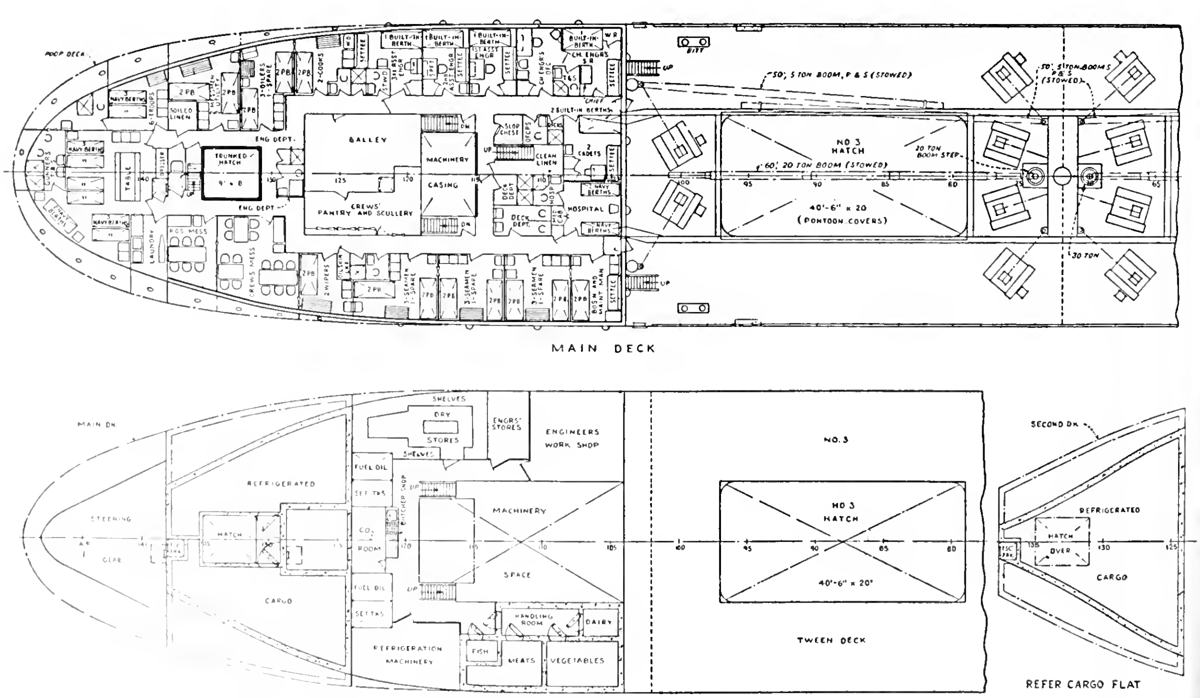


Hatch, winches and booms, looking forward.

The bridges, looking aft.



Profile and weather deck layout and bridges.



Crew's and engineer's living quarters and stores and refrigerated cargo spaces aft.

handle more than three times the deadweight of cargo out of much deeper holds. We suspect that this is due to standardization of the unit winch. Instead of double gearing, a pair of the winches to take the heavy loads at lower speed, extra standard winches are provided to handle these weights. Were it possible to use all this handling gear, and these winches at their capacity, and if longshoremen could be persuaded to handle the loads that fast, this vessel could be relieved of her capacity load in less than two hours. That no such speed is contemplated is shown by the fact that auxiliary generating sets for all purposes have an electrical output of 500 kw. The total winch load would be approximately 600 kw, with all working capacity loads simultaneous. It is apparent from the fuel consumption estimates in the table of characteristics that 200 hp is the load designed for port use in handling winches and cargo pumps.

The windlass, built by the Hesse Ersted Iron Works of Portland, Oregon, and driven through spur gearing by a G.E. 60-hp motor, handles 1-3/16 cast steel stud link anchor chain supplied by the Taft Alloy Steel Company of Taft, California.

Two 40-person-capacity motor lifeboats supplied by The Imperial Lifeboat and Davit Co. are hung in Barclay type gravity davits and handled by Barclay type boat winches, both supplied by the Landley Co. Inc. Four life rafts are carried on fast release slides.

The steering gear is driven by an Oil Gear Company pump actuated by a 10-hp Crocker Wheeler motor, controlled by a Dutchess Tool Company, Inc., telemotor, and all working through a hydraulic ram made by the Pelton Water Wheel Company. For emergency steering the May Oil Burner Corporation supplied a manually operated hydraulic pump. Thus the States of Wisconsin, New Jersey, New York, Maryland and Califorina each has a share in steering this craft.

Power Plant

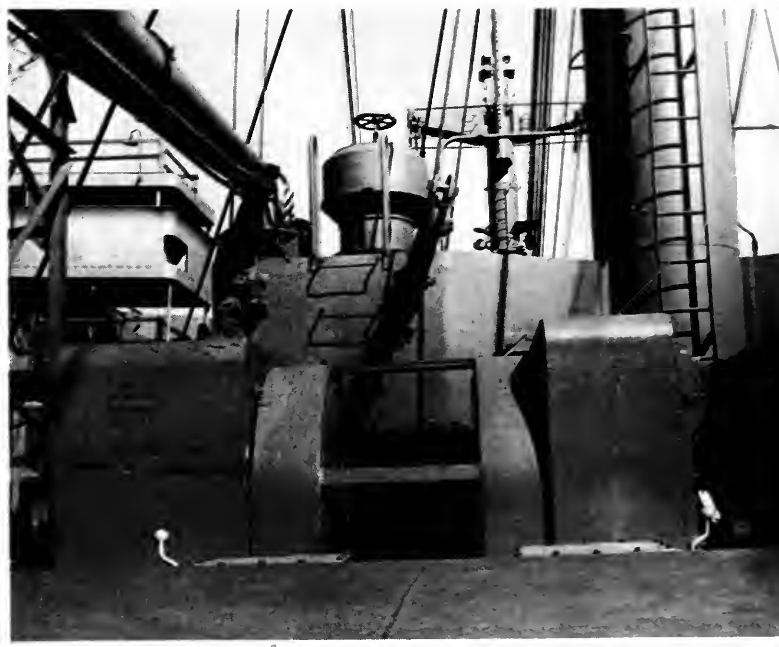
The vessel is propelled by a single screw 11 feet in diameter, driven by a Nordberg 2-cycle, mechanical injection, six-cylinder diesel engine with a normal rating of 1700 bhp at 180 rpm. The cylinders have a 21½-inch bore and 29-inch stroke with trunk pistons.

The engine is of the port scavenging design, the scavenging air, being supplied by an attached scavenging pump driven by a crank on the engine crankshaft. It is directly connected to a 10-⅝-inch-diameter propeller shaft through a Howarth thrust bearing, and is made reversible by an air-operated cylinder and gears.

The engines are required to operate continuously at a 10 per cent overload and for two hours at 25 per cent overload, all above normal.

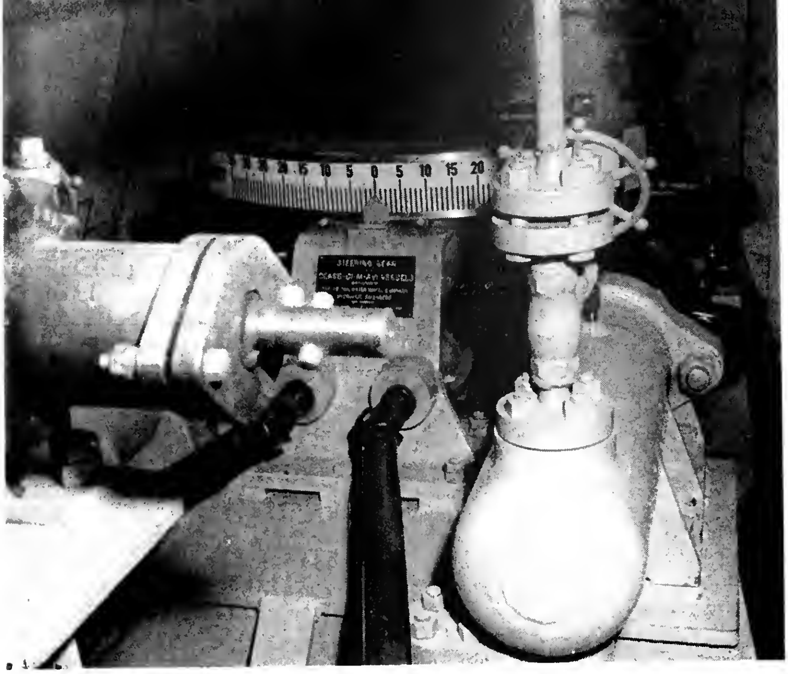
The overall fuel consumption of the complete plant at full load with normal operating and weather conditions prevailing must not exceed 0.44 lbs. per shp-hr. The maximum fuel consumption of the main engine above, for the full load at 180 rpm, is .39 lbs. per bhp-hr.; for the ¾ load at 164 rpm, .39 lb. per bhp-hr.; and for the ½ load at 143 rpm, .43 lb. per bhp-hr.

The general arrangements plans of



Motor-driven cargo winch.

Anchor windlass by Hesse Ersted Iron Works of Portland, Oregon.



the ship reproduced here show the fuel oil carried in a deep tank forward and in the double bottom. The main pumping features of this fuel oil system are a bilge and oily ballast pump, and a bilge pump, all by the Aurora Pump Co., both of 300 gpm; also a fuel oil transfer pump by the Quimby Pump Co, of 150 gpm. Oil from the service tanks is drawn by two booster pumps by the Quimby Co., and discharged to the main engine and generator engine pumps. Two De Laval Co. purifiers with a capacity of 300 gph are also provided. All this equipment is motor driven.

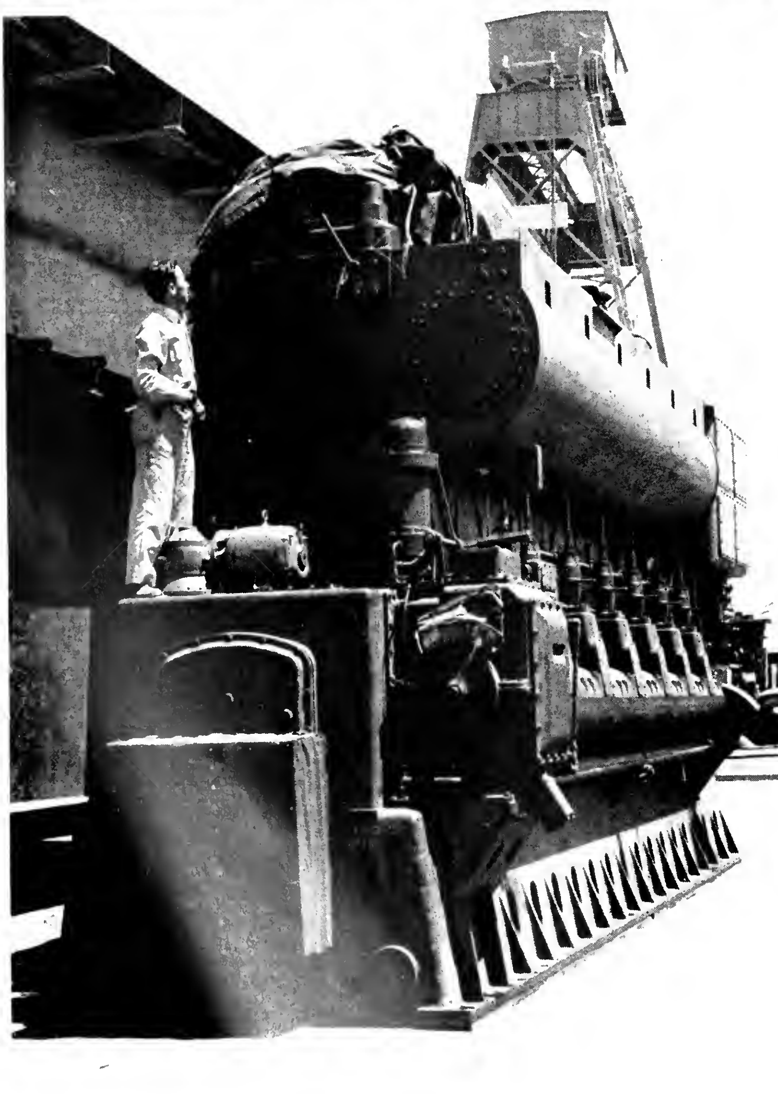
The lubricating system of the propulsion unit is of the pressure type with an elevated storage tank of 1000

Part of the steering gear.

gallons, from which oil is run to sump tanks under the main engine and each of the auxiliary engines. All of these engines are lubricated by their own systems. The main equipment used in operating this system is composed of two Quimby Co. motor-driven oil service pumps of 500 gpm, two Ross Co. coolers, a Hillard Co. combination oil filter, and two duplex strainers and discharge strainers by the Elliott Company.

The main and ship's service engines are started with air supplied from three motor-driven compressors; the two large ones having a capacity of 48 cfm, are supplied by The Ingersoll Rand Co., as is also the smaller one, with a capacity of 10 cfm. These compressors have automatic starting switches for integrated control, and will shut off at a pressure of 390 lbs.

The salt water systems are as follows: main circulating, evaporator feed, fire, sanitary, bilge and clear ballast. Two motor-driven pumps of 850-gpm capacity, by the Chicago Pump Co., supply the pumping equipment for the main circulating system, which also takes care of the compressed air coolers, salt water evaporator and distiller, by means of a branch line. The auxiliary engines have their own pumps attached. Two motor-driven pumps by the Aurora Pump Co., both of 400-gal. capacity, take care of the fire and the fire and general service requirements. A 100-gpm motor-driven pump by the Day-



The Nordberg diesel, main propulsion unit, awaiting installation.

ton Dowd Co. takes care of the sanitary service by means of a pressure system, with a supply branch from the fire main. The following pumps take suction from the bilge main: bilge pump, bilge and ballast pump, and fire and general service pump.

Miscellaneous Machinery

Steam for heating the officers' and crew's quarters, for fuel oil heating and for distilling, is supplied by an electrically controlled oil fired boiler by the Vapor Car Heating Co. of Chicago. It has a capacity of 2500 lb. of steam per hour at 100 lb. pressure.

Two diesel main generators, engines of 450 hp by the Enterprise Engine and Foundry Co., and generators of 250 kw by the General Electric Co., take care of the ship's auxiliary power requirements. There is also an independently arranged emergency diesel generator, engine by the Hull Diesel Engine Co., and a 15-kw generator by the St. Louis Allis Co.

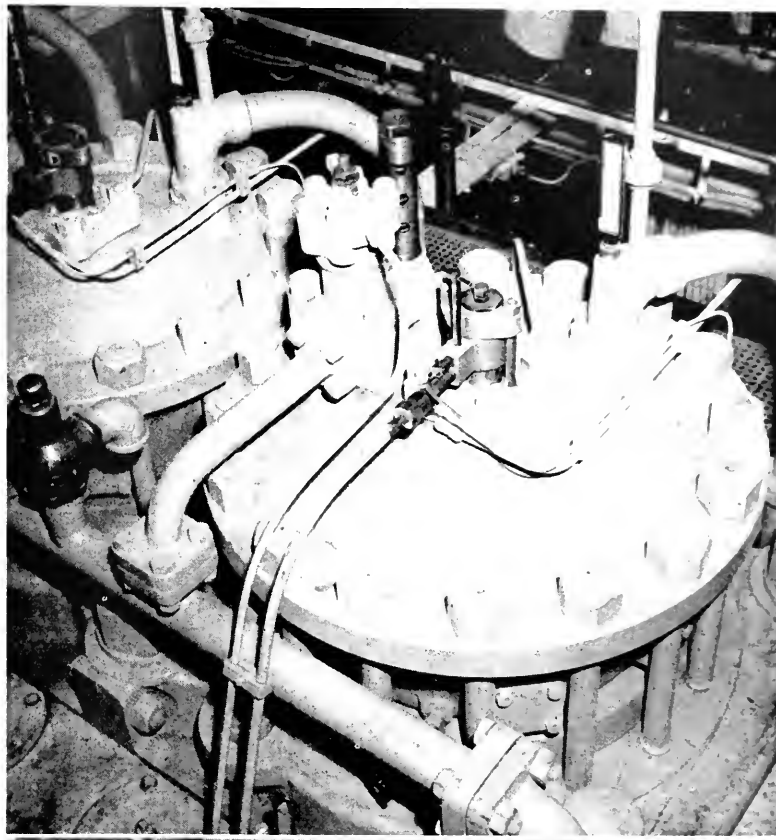
The ship's stores refrigeration system is subdivided in five compartments of a total capacity of 2730 c.f. These and the three refrigerated cargo spaces, the latter of 12,115 c.f. capacity, are served by three units supplied by the Air Temperature Division of Chrysler Corp.

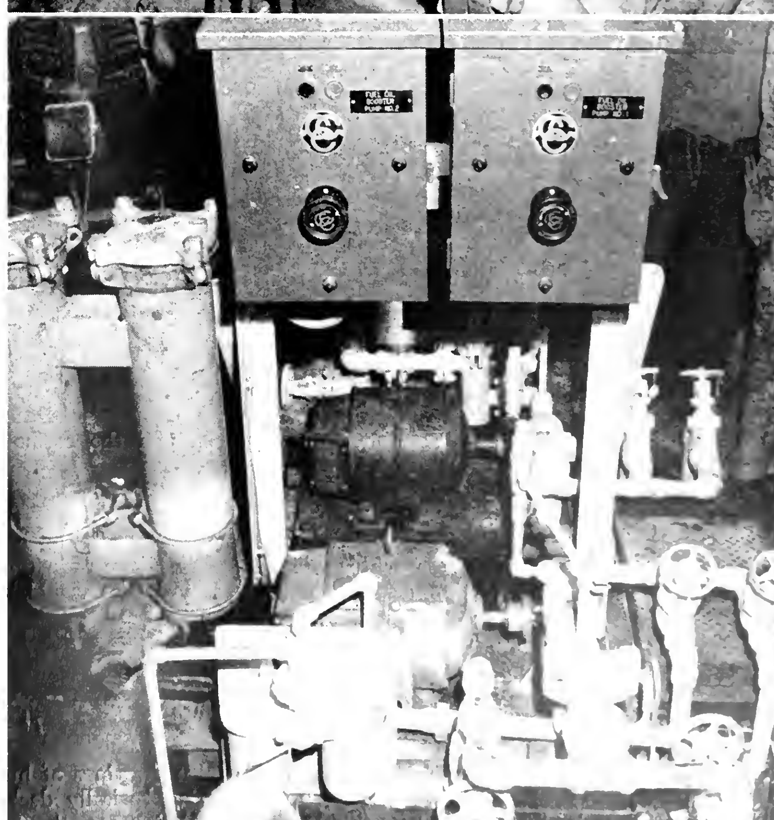
Other Equipment Features

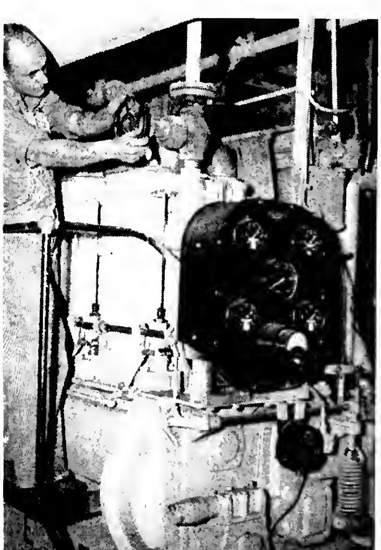
Some of the other equipment features are:

Joshua Hendy Co.—Fresh water

(Page 108, please)







Top of page: Two of the cylinder heods of Nordberg engine.

Right: Motor-driven booster pumps by the Quimby Pump Co. in the engine room.

Below: Enterprise diesel engine, which drives one main generator.

Planning and Production Methods

At Consolidated Steel's Plant

The USS Gilliam was launched at night.

THE USS Gilliam, a S4-SE2-BD1 combat transport, built by the Consolidated Steel Corporation's Wilmington, California, shipyard, was recently delivered to the U. S. Maritime Commission. By the time this article is in print it is expected that at least two more similar ships will have been completed.

The story of the design, construction and outfitting of this vessel began at the end of August, 1943, about eight months before the ship was launched. At that time Joslyn and Ryan, San Francisco naval architects and marine engineers, had the design and working plans so far advanced that the Consolidated organization was able to proceed with the planning and production phase of the job.

The major problem in beginning construction of an entirely new design was very evidently going to be a problem of converting the yard, facilities and men from one operation to another. In order to do this a tremendous amount of planning and production engineering was required. This planning covered three major phases: (1) rearrangement of yard operations to accommodate completion of old work and the beginning of new work without loss of time on either hand; (2) development of facilities and jigs which would ease and speed construction of a ship requiring twice the number of man-hours of a C-1 vessel; and (3) the production engineering of the design, developing units of construction applicable for use with the facilities available and consistent with good ship practice.

Another consideration was the training of yard personnel who had been indoctrinated in a certain type of construction, and who would be called upon to handle the construction problems on a ship which had never been built before.

I. Development of Hull Sections and Erection Sequences

From the design drawings of hull structures, covering basically decks, bulkheads, shell plating, etc., the primary breakdown of hull erection units was determined. A detailed analysis was made of the structural design in order to determine the most expeditious manner of breaking down the individual units and building up an erection sequence.

The largest part of this work was handled by the production superintendents and their assistants. Since the rest of the yard was still primarily engaged in construction of other critical craft, it was determined that the best way of proving the unit breakdown which had been decided upon would be by the use of a model. The materials for building the model were investigated, and a cellulose acetate plastic was chosen for the job. Units were reproduced in detail with this plastic, which served as three-dimensional developments of each item as it would be fabricated and preassembled on the skids before erection.

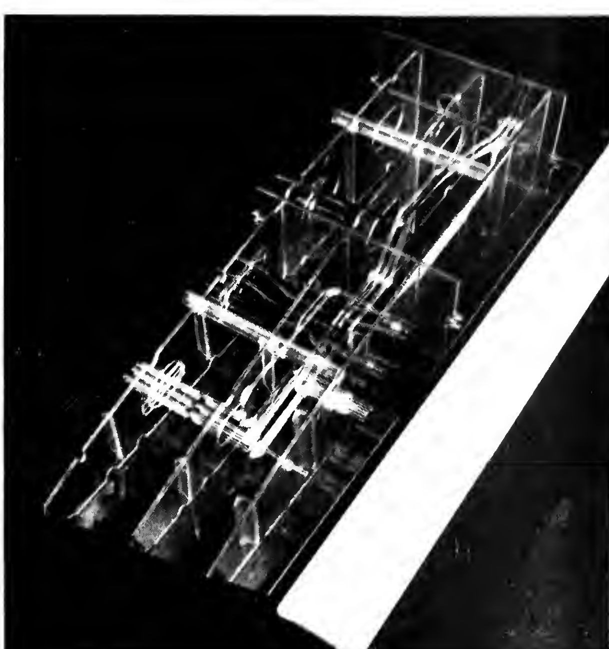
The engineering department established an office of field engineers to work in conjunction with the production department in developing additional working drawings covering each section of the ship and the material included in that setcion. By experimenting with the completed model a final erection sequence was determined which took advantage of every intricacy in the design insofar as speed and ease of handling was concerned.

Jig Requirements

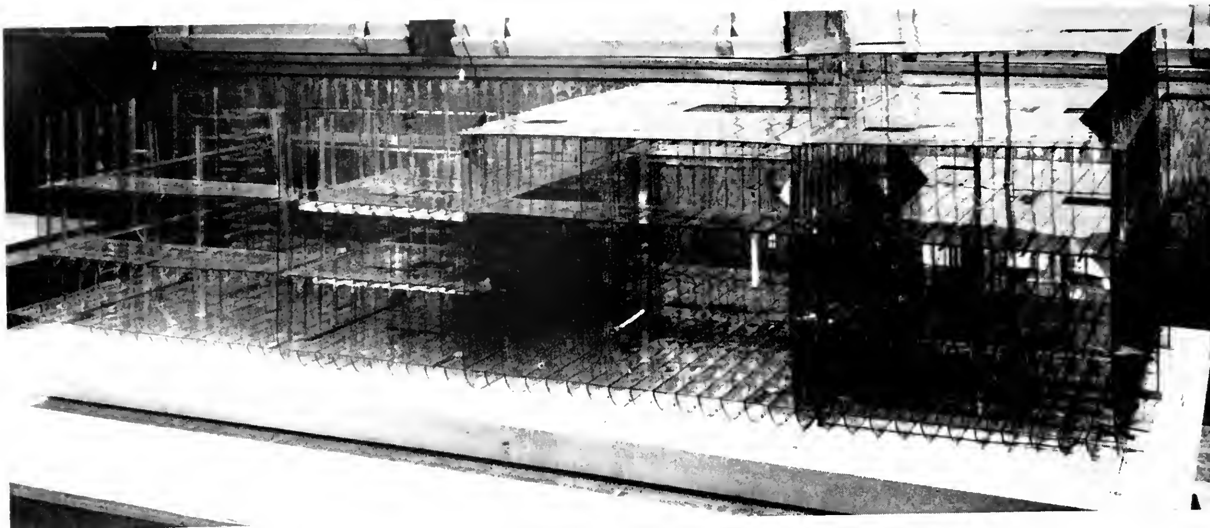
Every unit of the ship that would lend itself to production methods was analyzed for jig requirements, and a jig designed to accommodate that unit. In order to utilize this to the fullest advantage, the entire skid area of the yard was laid out to cover the preassembly operation by specializing

The USS Bracken ready for launching. Even the earliest ships were launched complete with superstructure, masts, funnels and boat davits all in place.

Small section of inner bottom unit, illustrating complex piping detail. This was developed as an aid in visualizing the drawings at this location.



Plastic model of the lower forepeak section complete with the exception of shell plating. Note size comparison with scaled silhouette of man placed on unit.

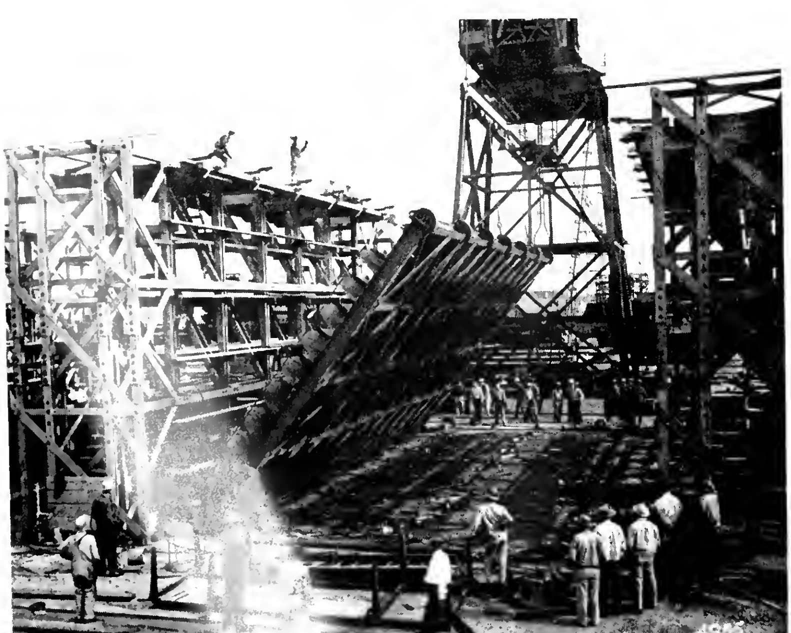


Practically completed portion of midship section of model with all major sections in position. Note that all items are faithfully reproduced with the plastic, down to the smallest detail.

each location to furnish a particular unit or group of units for all ships. The jigs themselves were of standard development and design, covering mainly reversed sheer and camber jigs for deck sections and male and female jigs for shell sections which could be positioned to allow automatic welding of all seams and down-hand welding of all frames.

In addition to this, a special jig was developed for construction of inner bottom units in which floors and intercostal girders were placed in a positioner consisting of a heavy base upon which were mounted upright angles spaced at normal frame intervals. In this manner the entire unit could be clamped in place and raised into position against upright scaffolding so that welding of all connections could be done in a down-hand position. When completely welded, the floor and girder unit was removed from the jig and placed on its tank top plating section for completion of the welding.

A view of the inner bottom jig as it is being raised vertically in order to position for welding.



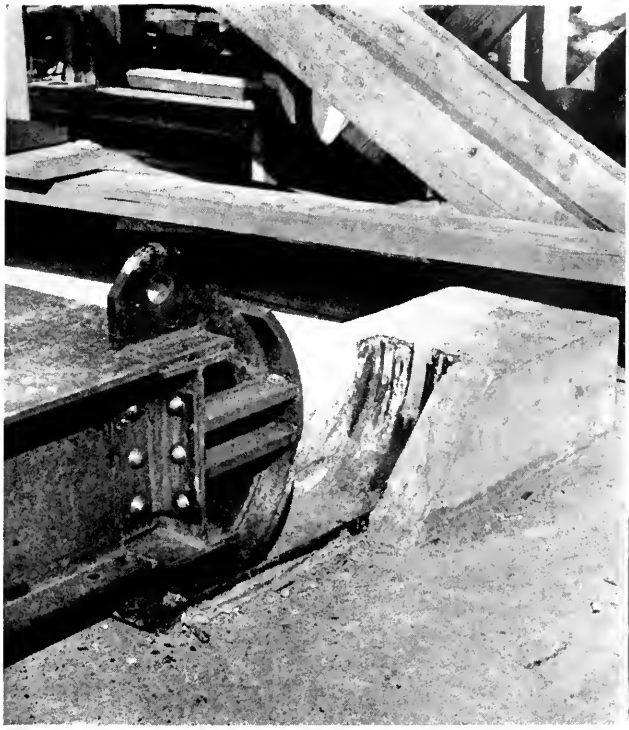
Superstructure Assemblies

The largest single units handled on this ship are the superstructure sections, which are approximately 125 feet in overall length. The superstructure was divided into three erection sections, the heaviest of which weighs approximately 90 tons.

Each of these sections is built in three sub-units consisting of a unit of deck and the bulkheads below that deck. These sub-units are built by assembling the deck sections in reverse sheer and camber jigs, and placing the bulkheads on these deck sections upside down, which allows all normal overhead welding to be done in a down-hand position. The lower sub-unit of each section is then turned over and placed in a true sheer and camber jig, allowing the upper sub-units to be stacked on top and final welding completed in a down-hand position. In this manner the only welding of superstructure remaining after these assemblies are placed aboard ship is in the tie-in of two erection seams joining the three units and in the welding of the lower bulkheads to the weather deck of the ship.

In handling these sections with the 45-ton maximum capacity of the Colby cranes available, an elaborate 90-ton-capacity spreader girder was developed which allows each Colby to boom up to a minimum radius on a heavy lift. This strong back and the lifting arrangement is illustrated in pictures elsewhere on these pages.

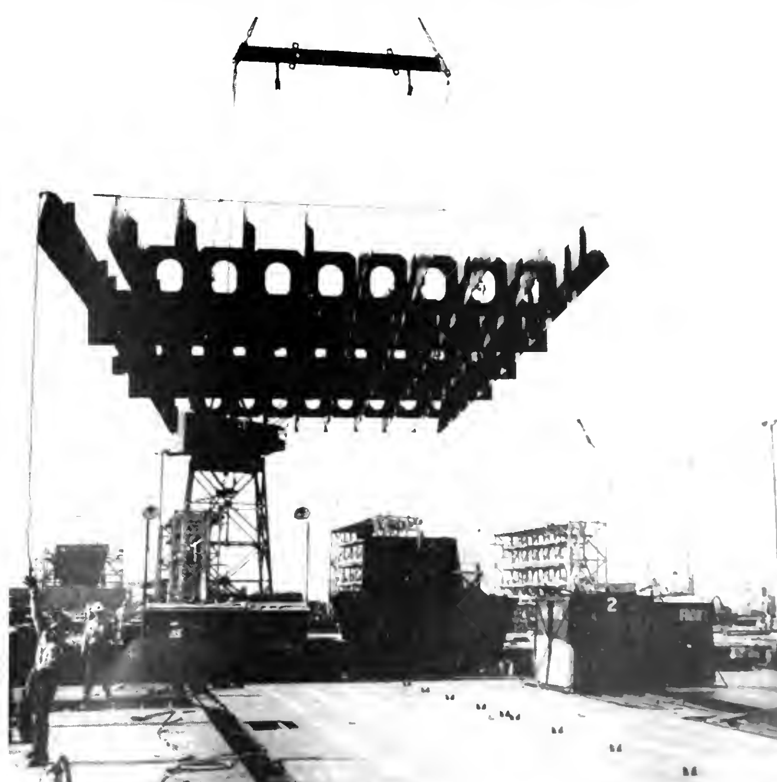
In order to gain the utmost value



A close-up of the rocker arrangement on the base of the inner bottom jig which allows jig to be positioned.

The inner bottom jig in its final vertical position.

A view of the completed grid section of floors and girders of an inner bottom unit being landed on its tank top plating for completion of welding.

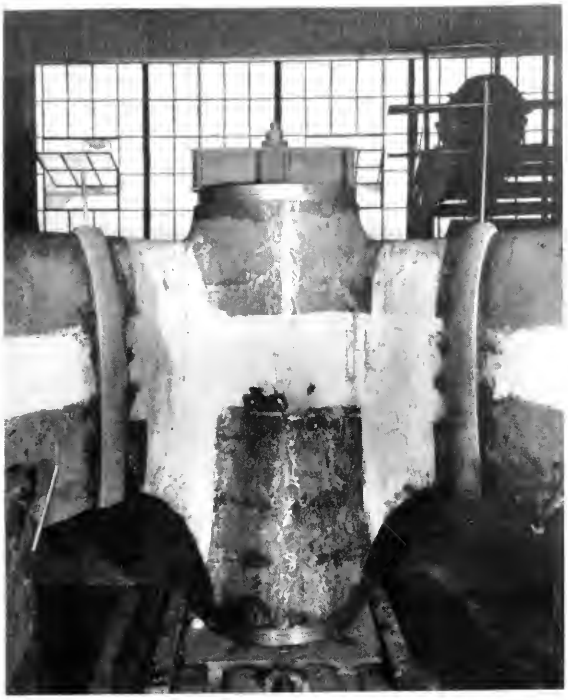


from all the planning done by the Production Department, and from the plastic model, a training program for yard supervision was begun in which each leadman, subforeman and foreman had an opportunity to study the model and plans before their work actually began. This proved very valuable during the actual transition from construction of the last C-1's to the first BD1's because it was necessary to lay the first keel on the first vacant way while the other ways were still engaged in C-1 construction.

Maywood Fabrication

The fabrication of all steel and some of the machining operations for the Wilmington yard are handled in CSC's parent plant in Maywood, California, located some 25 miles inland. Foundations, girders, funnels, and some bulkheads are subassembled in Maywood and trucked to the yard for final assembly and erection. Since the strut castings were made by the vendor in three sections, the Maywood plant assembled these sections and thermit welded the joints before shipping to Wilmington yard.

The keel was laid for the first ves-



Two-way molds which appear in this picture will form pattern for the thermit weld.

sel on November 30, 1943, which was only a little over three months after Joslyn and Ryan had begun their work on the design drawings, and it was due to the combined effort of CSC's engineering, material, and production departments, working in conjunction with the design agent under the direction of the USMC regional office, that the job could then proceed with a minimum amount of trouble and confusion.

An illustration of the initiative and drive which overcame all obstacles lies in the story of the stern tubes on the first ship. Due to the speed of the program the vendor had been unable to meet his schedule on the first delivery, and shortly before launching Maywood was called in. The two stern tube assemblies are made up of two castings, each joined by a section of rolled plating, each covering some 20 feet in length. Arrangements were made to procure the castings locally, and Maywood improvised a jig, lined up the castings, welded the units together, completed the rough machining operation and delivered the units to the yard in time for installation and final operations before launching.

II. Engine Room Mock-up Development

While the program was still in a preliminary stage, and concurrently with the beginning of construction on ways and skids, it was decided to build a mock-up of the engine room spaces. The decision was made only after a careful consideration of the probable costs and of the probable advantages to be gained. The major factors that influenced the approval of the mock-up were that it would show up interferences not shown by the drawings; that it would train construction crews at an earlier stage than otherwise possible; and that it would allow drawings to be corrected, and templates to be made from the work itself. The cost would also be offset in part by the use of the fabrications, particularly piping and ventilation, on one of the ships after the mock-up had served its purpose.

As constructed, the mock-up is a faithful three-dimensional full size reproduction of the engine room spaces. Concrete was poured for the floor, or tank top. The supporting structure was made of wood, and, as closely as possible, follows the structure of the ship. The overall size was approximately 100′ long, 60′ wide, and 40′ high.

Stiffeners for bulkhead and shell frames are represented by doubled 2″ x 6″'s; the longitudinal and transverse girders by built-up wooden beams. These, together with wooden columns representing the stanchions, carry the weight of the building and equipment. The platforms are planked but no other plating is shown except in spots. This made for ease of access with plenty of light, and, together with the transparency effect, was found to be of decided advantage.

All frames, deck beams, bulkheads and decks were labeled to indicate the molded lines. Waterlines and buttock lines wree liberally marked to facilitate setting equipment. Temporary access cuts used on the hulls for both traffic and the shipment of machinery are indicated by openings in plywood sheets which simulate the plating. Any support which is necessary, but is not representative of the ship, is painted distinctly and clearly marked.

Equipment Reproduced

Equipment and machinery is largely represented by wooden models, built roughly to scale, but some pieces if light enough, and available, were actually installed. For example, boilers, propulsion motors, generators, condensers and other heavy items are done in wood. Items such as the auxiliary air ejectors and the main sea chests were actually installed. In most cases, however, the machinery was too scarce to be tied up in the mock-up, and some substitute was used. Some items are only indicated by pipes or plates. The salt water evaporators, which are cylindrical, are made of two circular plates joined by a section of pipe. The D. C. heater, another symmetrical unit, is merely a length of pipe. Most of the pumps are simulated by wooden models or pipe sections. In all cases connection flanges were set as target points in their true position.

Though most machinery, equipment and structure was modeled after the original, all piping, ventilation, electrical work, was actually fabricated and installed. It is in this work that the greatest value was obtained, both in the training and in the elimination of interferences. All piping was templated to fit and to avoid any interference. Wireways were installed for all electrical work, and scrap cable pulled in tight sections. In the raceways where the sequences were not difficult the cables were left out, but the wireway itself was installed to show clearances. All vent ducts were installed as in the ship

A section of fan tail has been removed from its jig and placed aboard the transfer car.

itself. As the material was installed it was clearly labeled. All piping systems were followed out and marked in accessible locations. Since speed was essential, tack welding only of joints was done and duct sections were merely bolted loosely together.

Interferences Cleared

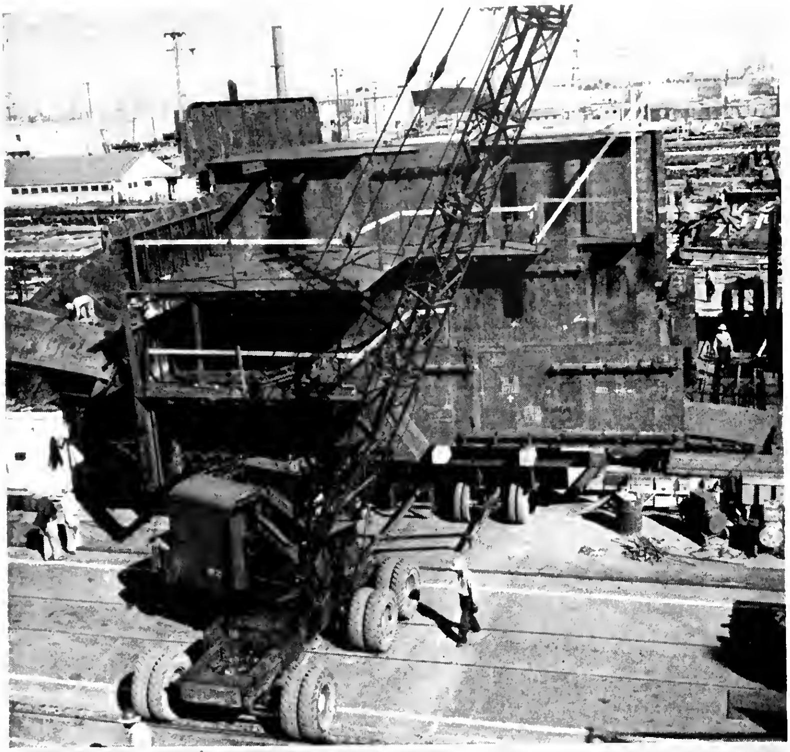
From these installations and the three-dimensional view which they allowed, practically all interferences were worked out before they reached production. As the unit became more complete and certain systems were proved to be clear of any trouble, the drawings were changed, if necessary, to conform with the installation. In numerous cases, improvements were made possible by the preview of production made possible by the mock-up. Also complete shop and installation details of ladders, gratings, floor plating and supporting structure were developed on drawings from mock-up installations.

In addition to its very important

A layout of the bottom shell jigs showing rocker arrangement to position jigs for automatic welding.

function of eliminating interferences, the mock-up speeded production by training and orientating the construction crews of the various trades concerned, since these men did the actual work in the mock-up on actual ship material. Experience was gained not only by the performance of the job but by the clearer view of the overall picture, allowed by the transparency of the mock-up.

As a result of the mock-up, the work in the engine room spaces of the first hull went off very smoothly and the men were able to move right into their jobs. If the mock-up had not been set up, the first ships would have had to serve the same purpose, and the resulting confusion would have probably resulted in a lag in completion of the engine room spaces, which in turn would have seriously affected the delivery of the ships.



The forward section of superstructure is the largest lift. This is the section as it went aboard the first hull. Sections are built in one location on the skids and transported to the proper way by means of the transfer car illustrated.

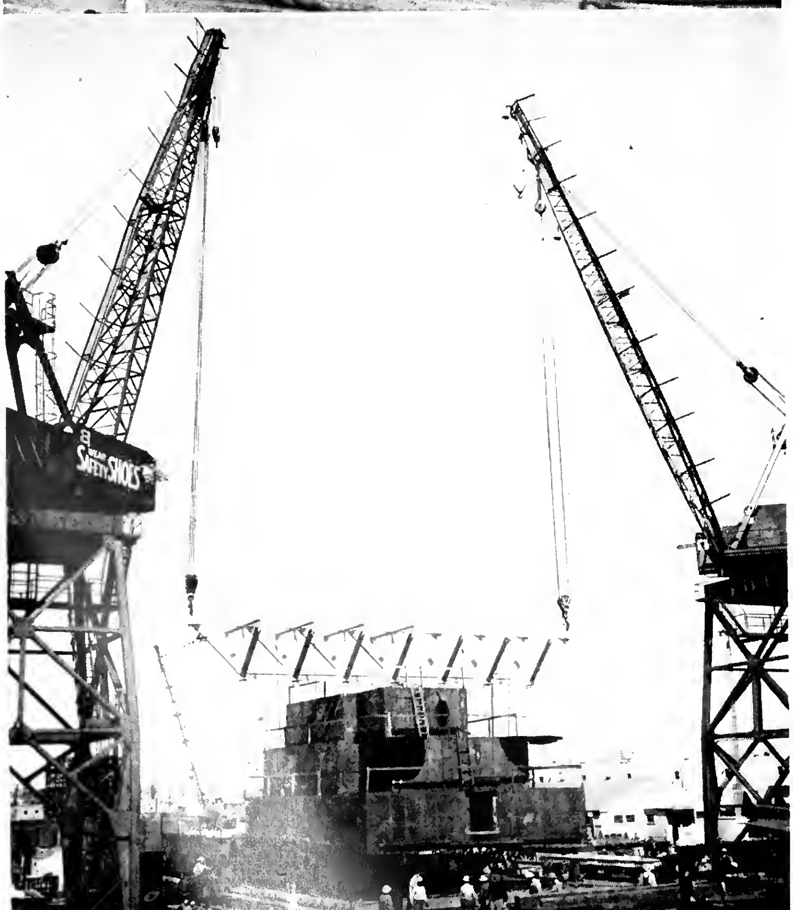
The U. S. Navy Pre-Commissioning Detail, in its work of training operating personnel to man the APA transports, has recognized the value of the mock-up installations, and has incorporated the use of the mock-up in its training program as an aid in familiarizing future crews with the layout, design and operation of the engine rooms on these vessels.

III. Outfitting and Completion

The first BD1 hull was launched as scheduled at 11:30 p.m. on March 28, 1944.

The job had only begun. That the problem of fitting out these attack transports in a tremendous task is apparent when it is pointed out that the first ship was only about 40 per cent complete at launching. From the start it was known that these ships were a "rush," and that the utmost effort would be required to place them in service as soon as possible.

The completion phase of a first ship of a new design resolves itself into two major problems: (1) purchase, manufacture and delivery of



A spreader girder with 90-ton lifting capacity was developed to handle the large sections of superstructure on the BD1 job.

equipment, and (2) solutions to installation problems and normal craft interferences arising during construction.

The entire project was from the start under the direction and sponsorship of C. W. Flesher, Director of the West Coast Regional Office of the United States Maritime Commission. The extreme speed of the program demanded that the builders, the design agencies, and the U.S.M.C. approval and procurement agencies maintain the closest possible contact in order to keep coordination of efforts on a day-to-day basis.

Production Analysis

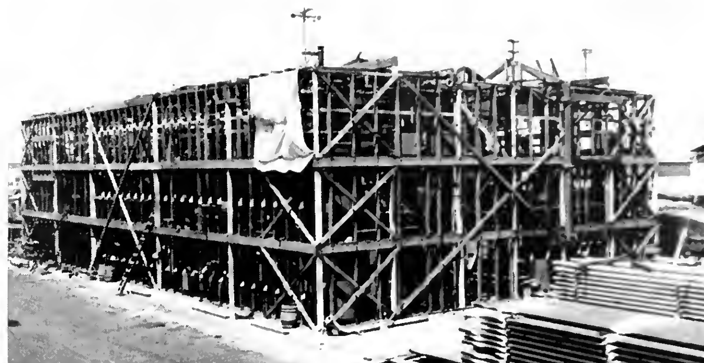
It was at this time that the full effect of the planning which had gone before was realized. Several months prior to launching, a representative of each of the major outfitting crafts was assigned by his superintendent to work in a liaison capacity for his craft. These men spent a considerable amount of time in study and analysis of every drawing affecting their craft. These analyses were written and published with a wide distribution to engineering, material and production personnel as a means of passing on this information to all concerned.

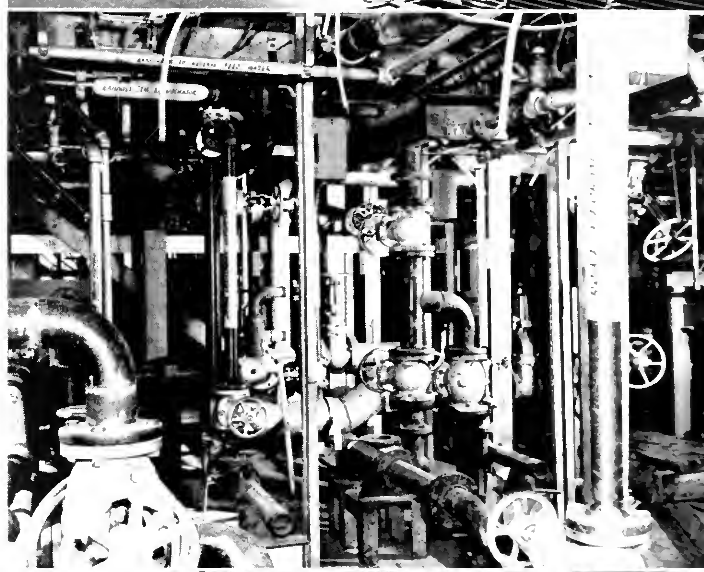
In conjunction with the material departments, a complete study and survey was made of the work of each craft insofar as material and equipment was concerned. This enabled proper allocation of work among crafts and proper scheduling to reduce craft interferences to a minimum. In particularly difficult locations, such as the galley areas, very complete analyses were developed and detailed sequences of work agreed upon before the start of the job.

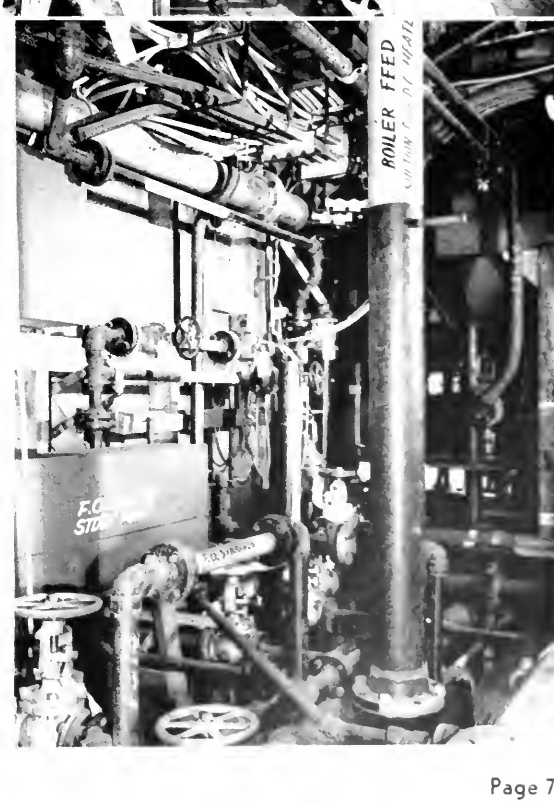
Although manufacturers all over the country were gearing their operations to tie in with predetermined construction schedules, it was evident that many major items of equipment would be received too late to be installed during the regular erection sequence on the ways. A detailed analysis was made of the problems of installing each of these items, and it was apparent that careful planning of temporary access openings and methods of moving equipment into place would be required

One of the largest problems was that of access and shipment into the engine room areas, and this was accomplished by a hole through the shell into the port side of the forward

(Page 108, please)







Top: A view of the engine room mock-up building, which was constructed as a full-size, three-dimensional development of the drawing to aid in checking interferences, correcting working drawings, and training operating personnel.

Center: View of piping in the auxiliary machinery space in the mock-up.

Right: Piping and electrical development in the mock-up.

Typical brittle-failure of steel plate.

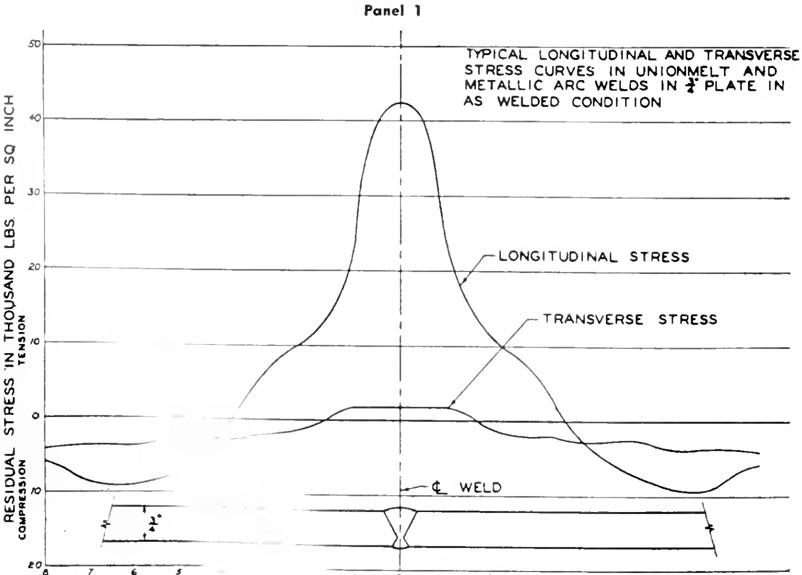
Notes on Welding and Welding Stresses

By H. E. Kennedy, Research Engineer*

Electric welding began modestly. In fact, it did not begin as welding at all. Slavianoff, a foundry man, was searching for a method for making small castings when their tonnage was too small to light a cupola. He connected one pole of an electric generator to an electrically conductive mold, such as graphite, and the other terminal to a pair of tongs gripping an electrode of the metal to be cast. The arc between the mold and electrode melted the metal, which dripped into the mold and assumed the shape of the mold.

There was no mention of welding in Slavianoff's patent. He did refer to the repair of defects in castings by this method. This could be construed as a disclosure of welding as we know it today.

Panel 1



So expensive a melting process could not survive. Unfortunately, the metal deposited under these conditions was exceedingly brittle. Thus, his method was not used except in instances where great reliability was unimportant.

It was natural to blame the loss of ductility of the metal on oxygen. It is chemically active and affects steel adversely. Electrodes were covered with oxygen-consuming materials, such as cellulose, or with slag-producing ingredients, all functioning to protect the weld metal from the atmosphere. There was a substantial improvement in every desirable property of the weld metal. Shielding the arc from the atmosphere was a milestone in the development of welding.

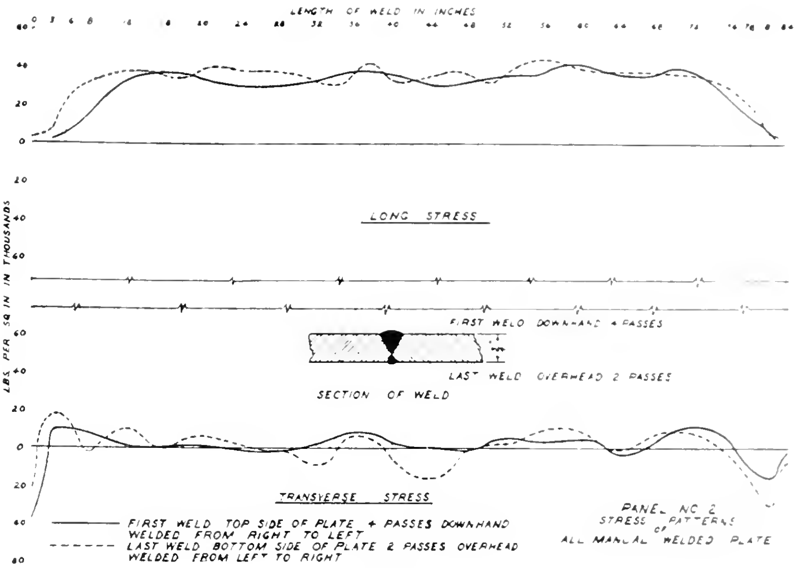
However, subsequent experiments have vindicated oxygen. In fact, without oxygen, electric welding would be impossible. In some inexplicable way, a force is developed which produces a crater. It is as if the fluid material leaving the electrode acquired sufficient kinetic energy to depress the molten metal against the head of metal behind it. When oxygen is not present, this phenomenon does not take place. Nitrogen was not suspected because it is inert.

Electric welding advanced with incredible rapidity when confidence had been established. It was handicapped slightly by distortion. However, as techniques improved, sequences were adapted which minimized this drawback. Of course, it was well known that severe stresses could be set up in welded structures. In fact, there was not a clear distinction in the minds of all welders between stress and distortion. They believed that when ditsortion was absent, stresses were low, and vice versa. The importance of welding stresses was not realized until the dramatic failure of several bridges in Europe and the breaking of the S. S. Schenectady. These disasters focused attention on welding stresses.

Welding Stresses

It is helpful, in analyzing the problem, to demonstrate—step-by-step—the process of producing a stress by heat. Imagine a large plate of steel, thick enough to avoid buckling. On one edge of the plate are two refer-

* Paper was read, June 30, 1944, at San Francisco, before the Northern California section of the Society of Naval Architects and Marine Engineers.



Panel 2

ence points. An extensiometer is placed so that any movement of these points may be accurately gauged. A pyrometer should be located between points.

Now let the plate be heated from the lower side, directly below our apparatus. As the temperature rises, the points will move apart in almost direct proportion to the temperature rise until a certain temperature difference exists between the unheated and heated portion of the plate. At this temperature no further movement of the points will take place, even though it is heated further. If now the plate is allowed to cool, the points will move together. When equilibrium has been established, the points will be closer together than when the experiment began. If the heated section between the reference points is removed from the plate, the stress will be relaxed and the points will return to their original spacing.

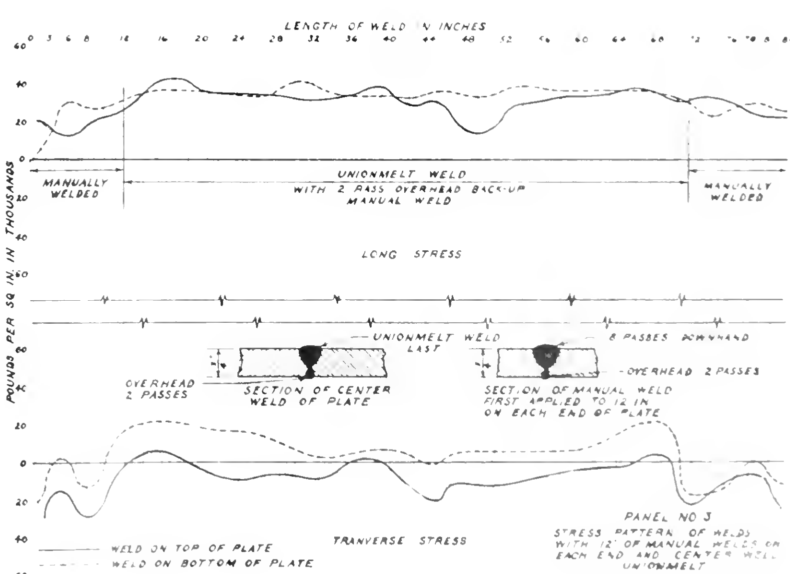
This experiment demonstrated that a residual stress may be produced by thermal means when these conditions are fulfilled: the material must have a coefficient of expansion other than zero, there must be a difference in temperature between adjacent parts, and there must be plastic deformation of the stressed parts. It further demonstrates that stress determination may be made by relaxing the stresses and measuring the change in strain. These elementary facts are well understood and are used every day in the shrinking process wherever it is desired to reduce the area of a plate by thickening it.

When the experiment began, it was assumed that the edge of the plate was straight. However, in the heating, the edge of the plate will become convex; when cooled, it will become concave. Now imagine a second plate treated in a similar manner and the two edges brought into contact. Due to the concave edges, the plates will contact only at their ends. There will be a gap at all other points, which will require a transverse tension in order to cause the plates to come into contact for their entire length. Thus the ends of the plates will be in tranverse compression, and the remainder in tranverse tension when they are welded.

Magnitude of Stresses

There has been a lack of accurate information on the magnitude of these stresses. This is quite understandable. The extension under severe loads is very slight, so precise measurements are necessary. Strains must be measured in a stressed and relaxed condition. The only method for relaxation consists of removing the specimen by mechanical cutting. Electric strain-indicators have greatly facilitated the measuring of welding stresses. They are accurate, simple, and capable of indication strains over very short distances.

Theoretically, the strain indicator depends on the facts that the electric resistance of a conductor varies with its length, its cross-section, and its temperature. In practice, these facts are used in the following manner: A fine filament of wire of desired length is formed into a grid and cemented to a thin strip of paper. The wire is wound under tension and is of such cross-section that the paper can sustain the tension of the wire. This little gauge is then glued to the spot on which a stress measurement is to be made. Through suitable terminals this gauge becomes one arm of a Wheat stone Bridge. A second arm of the bridge is known as the "Dummy."



Panel 3

The Dummy is located close to the measuring gauge so as to follow its temperature variations and so compensate for a change in the resistance of the gauge due to temperature. An initial resistance reading having been taken, the section containing the gauges is now removed by drilling. A second reading of the resistance of the gauge follows. The difference between the two readings is a direct measurement of the contraction or expansion of the specimen. Gauges are always located at identical points on opposite sides of the plate. In order to compute the magnitude of biaxial stresses, the direction of which is known, two strain readings must be combined. Through a well-known mathematical relationship, the magnitude of the stresses at any point in a plate may thus be determined. However, for a thick plate, a third strain should be measured through the thickness of the plate. This is not feasible with present apparatus. With such equipment and technique, I have measured many types of welds. We are impressed by the consistency and reproducibility of welding stresses. They are not erratic, as one might imagine.

Briefly stated, the maximum stress in an unrestrained weld is on the center line of the weld. The value of this stress is nearly that of the yield value of a specimen removed from the weld. The stress increases from zero to a maximum value about nine inches from the ends of the plate. The magnitude of the stress will vary from 37,000 to 52,000 p.s.i., depending upon the thickness of the plate and the plate preparation. A series of test plates, identical in all respects and welded in different manners with different processes, did not show any significant variations in the magnitude of the longitudinal stress (see attached curves). The transverse stress is of much less magnitude. It begins as a compression at the two ends of the plate, reverses its sign about ten inches from the end of the plate, and becomes a tension stress from 5,000 to 15,000 p.s.i. Different procedures have a greater effect upon the transverse stress than on the longitudinal, sometimes causing it to alternate from a positive to a negative value along the weld. Since it is always the lesser stress, these variations do not seem significant.

One very obvious inference to be drawn from these tests is that a short weld is not highly stressed longitudinally, since it takes about nine inches to attain maximum value. The tension on the center line of the weld decreases symmetrically on either side of the weld, becoming zero about three-and-a-half inches from the center line of the weld. Here the sign of the stress reverses and the rest of the plate is in relatively low compression. Rate of cooling does not influence the stress pattern. Flux was allowed to remain on the weld, after having been made by Unionmelt, until after the plate had reached atmospheric temperature. In addition, insulation extended beyond the area covered by the flux so that cooling was extremely slow. This plate was compared with one wherein the cooling had been very rapid. The flux was removed directly behind the welding zone, and a jet of compressed air directed against the weld. There was no difference in the stress pattern in the two plates.

Proper welding sequence seeks to avoid reaction stresses. If a member is restrained during the welding process, there will be developed a stress varying from negligible value to the yield point value, depending upon the degree of the restraint, and the length of the member. These stresses are generally small because the compression members which support the tension stress buckle and so cause excessive distortion. It takes a great deal of stiffening to develop a stress equal to the yield point.

Causes of Failure

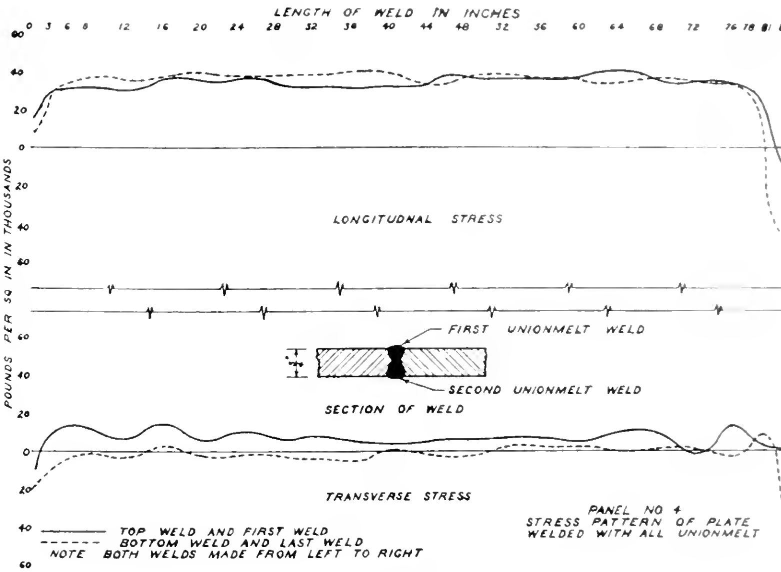
In examining the cause of failure, it is logical to consider a mechanism with which we produce a deliberate failure to see what elements are necessary to produce failure. A power shears is such a mechanism. The blade descends upon the sheet to be cut with sufficient force to cause the plate to fail in shear. The fly-wheel provides the energy to propagate the failure; without the fly-wheel the blade would merely nick the plate without completing the cut. When a plate fails, there must be sufficient energy available, or else the failure will not occur. This energy is stored as strain energy. In order to investigate the available energy to propagate a crack, two pins were located about one inch apart and on the center line of the weld of two unrestrained plates. In addition, strain gauges were placed along the center line of the weld. A cross cut was made in the tension zone by drilling a series of intersection holes between the pins. The pins moved apart and the strain gauges indicated relaxation about ten inches on either side of the cut. Knowing the average reduction of stress and the movement of the pins, one may compute the available work to propagate a transverse crack initiated in the weld. The limited energy thus released is totally insufficient to cause a crack to extend more than a short distance from its origin, and this is borne out by the practical evidence on the assembly platforms.

Restrained Weld Stresses

In the case of an externally-restrained weld, the facts are entirely different. Let us assume that a plate is welded in a window, as indicated in figures 1 and 2. The test plate will be in tension and the supporting members of the frame, in compression. At whatever point the tension member is cut, the entire strain energy of the system will be released instead of a limited amount, as in the case of a residual stress in an unrestrained plate. Sequence then controls distortion and, equally important, determines the availability of energy to complete a failure. (Pressure vessels are tested by hydrostatic pressure. There is much less stored energy than when an equal stress has resulted from air or steam at the same pressure, and therefore the hazard is less.)

A very simple experiment illustrates the conversion to potential of thermal energy and its final release as kinetic energy. A piece of glass, four by five inches, is placed over a hot copper block three by four inches. The glass directly above the copper block will become heated and will tend to expand against the cool border overhanging the copper and therefore not heated. This condition parallels a panel welded on four sides, all the welds being in tension, and the center section of the plate in compression. With sufficient temperature difference, the glass plate will split, the pieces flying apart. If the experiment is repeated with a notch filed on one edge of the glass, failure will begin at a much lower glass temperature because the stress at which cracking begins is lowered by the notch. In general, the two pieces do not separate, and frequently the crack fails to cross the entire piece. Not only does this experiment illustrate the method of converting thermal to strain energy, but it indicates that a crack may cross a compression zone. That is to say, the zone was in compression at an instant before the crack originated.

Nature's method of reducing stress is yielding. Mild steel yields, and so redistributes stresses when they exceed the yield point of the material. Yielding puts a ceiling on stress. We can, however, impose sufficient restriction on the most ductile materials so that this property is lost. Notches are the most common of these. Every welding school uses notches in order to break a weld specimen for examination. It is also used to break rails. In some instances, a simple notch is not sufficient to destroy ductility, but it always decreases the total energy necessary to produce failure. A second method of inducing brittleness is lowering the temperature. Ship-plate may be ductile in a notched tensile specimen at 70°F, but will generally become brittle if the temperature is lowered to 40°F. This is well illustrated in a practical manner by the joggling of plates.

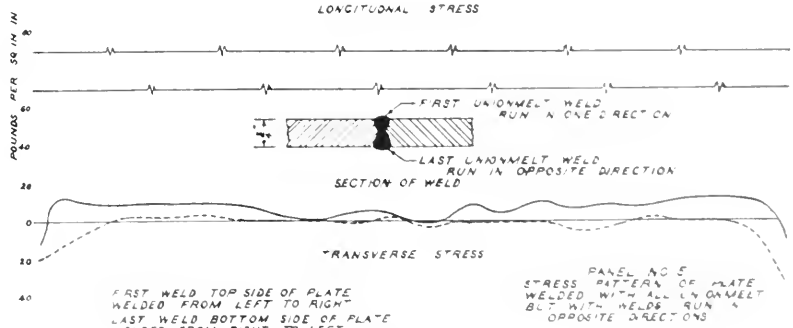


Panel 4

This severe operation frequently cracks plates on a cold morning, so that it is customary to use a heating torch to warm the steel to a blood heat to avoid cracking.

Plate Failures

In order to investigate plate failures, it is necessary to be able to produce failures at will. Referring again to figures 1 and 2, test specimens are welded into the window. Strong backs prevent distortion of the restraining frame. With such a restraint, simple axial or biaxial stresses of yield-point values may easily be attained, depending upon whether the plate is welded on two or four sides. Simple axial tension is all that is necessary to produce a brittle failure. If a saw cut is made on one of the unwelded edges, and the temperature of the plate is lowered sufficiently, a sharp hammer blow will fracture the plate. A square hole cut in the center of the plate will do likewise. On the other hand, with identical notches the compression members of the frame may be heated to expand them, and thus stretch the



Panel 5

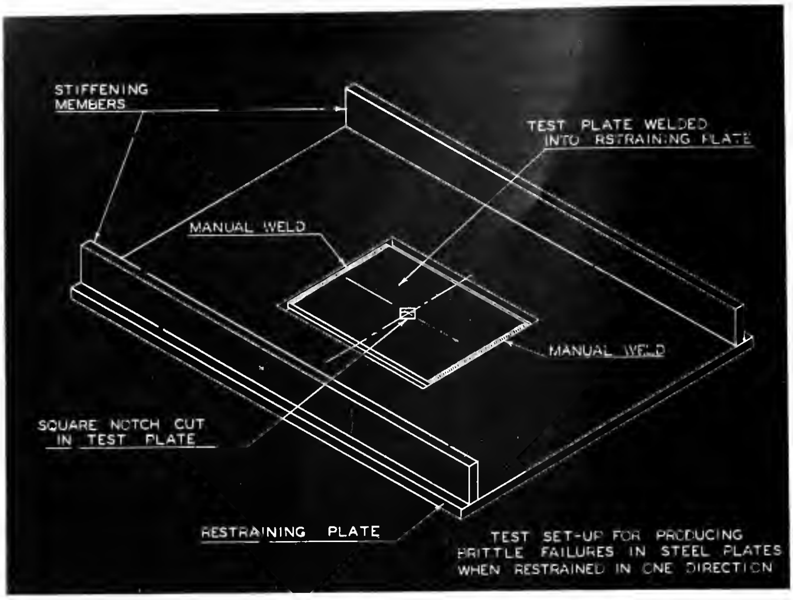


Fig. 1

plate without any sign of failure. It is also true that cooling as much as 130°F below room temperature will not produce failure even with the most intense sledging of the specimen in the absence of a notch. A circular hole equal to, or smaller in area than, the square hole cannot be induced to fail. The brittleness with which we are concerned is not the brittleness of cast iron. The steel will bend under intense cold, as it would at room temperature, because the ordinary properties of steel are not greatly affected by lowering the temperature. After failure has occurred and relieved it of stress, the specimen cannot be shattered by impact, nor can it be induced to fail in any direction other than at right angles to the stress. We now have an additional requirement in order to have a failure. That is brittleness of the steel induced by lowered temperature and the geometry of the piece.

To sum up, then: A failure will occur, first, when a local stress is sufficiently high to initiate a crack; second, when there is enough energy to propagate the crack; and, third, the ductility of the steel is impaired by notches and low temperature.

Critical Temperatures

It is exceedingly unfortunate that critical temperature at which ship-plate loses ductility in the presence of a notch is so close to ambient temperature. To illustrate: a series of test specimens, each containing an identical notch, were tested in a tensile machine—half at room temperature and half at 40°F. Those at room temperature were all ductile; those at 40°F were all brittle. It has been observed that failures do not occur in smaller ships. This may be explained by the fact that thin plates require a lower temperature to induce brittleness in the notched condition than do the thick ones. For example, a series of test plates, identical in all respects except thickness, tested as follows:

7/16 plate became brittle at 32°F
⅝ plate became brittle at 40°F
¾ plate became brittle at 56°F

(See photograph for typical brittle failure.)

Hogging or sagging a ship during hot weather might be a beneficial treatment, but it could be fatal during cold weather. The cracking of refrigerated ships is only indirectly the result of additional thermal stresses due to cooling. It is due to the loss of ductility at some point of high-stress concentration.

Not only is it possible to produce a brittle failure experimentally, but the failure can be arrested by causing the steel to behave in a ductile manner in the path of the crack. A specimen under tension, as described previously, is pierced by a square hole simulating a hatch. The area around the hole is cooled in order to induce brittleness. A spontaneous crack, originating at two opposite corners, progresses to each edge of the plate until reaching the vicinity of the edges. These areas have been maintained at room temperature. The cracks stopped at the warmed areas, which behaved in a ductile fashion by yielding greatly and without fracturing. Thus it was that, while the brittle section was unable to convert into heat the additional strain energy produced by cooling so that fracture took place, the two ductile sides yielded sufficiently so as to convert all the remaining energy into heat .

It is possible to lower the temperature at which brittleness occurs in the manufacure of the steel. Aluminum-killed steel shows superior properties at low temperature in impact tests. Nickel additions show similar improvement. Therefore, superior steels at hatch corners might constitute cheap insurance.

It is also possible to increase the temperature at which brittleness sets in. This is most easily done by overheating. Ordinary ship-plate heated above 1800°F will invariably become brittle above the temperature at which it was originally brittle. Careless spot-heating or overheating of frames markedly predisposes the section to failure.

It would be wise to reconsider the methods which have for their objects the reduction of welding stresses. Furnace treatment results in almost complete relief of all stresses. This method is technically and economically impossible for ships. The only other conventional method is peening. It has been shown that an unrestrained panel containing a weld has a longitudinal tension of near yield-point value. Now, if peening is to be effective, the weld metal must be stretched in a direction parallel

to the weld. In order to test this, a series of discs were cut so that the weld passed through the center of the discs, as indicated in the sketches. These discs were stress-relieved, turned to a given diameter, then peened. In every instance, the diameter increased at right angles to the peening. So peening parallel to the weld does not reduce the longitudinal tension. These experiments check with the practical facts. Welding first began as a repair tool. The welds were short, but frequently highly restrained—a patch in the crankcase, or the bottom of a cooking-pot. Here the transverse stress is high, the longitudinal stress, negligible, so that peening—which would stretch metal at right angles to the direction of the peen—would tend to lower the transverse stress caused by external restraint and so prevent cracking.

Shortly after the failure of the Schenectady, I conceived a method which materially reduces welding stresses. It is based on the principle of reversing the temperature difference which produced the stress. With our strain-gauge measurements, we found that a tension zone exists in the region adjacent to the welds. The material of the weld is stressed almost to the yield point, while the supporting compression zones are very lightly loaded. If, now, the compression zones are heated simultaneously, they will expand and stretch the tension zone. If the heating does not exceed 350°F, the heated section will not upset and so create a new tension zone. The weld, being nearly at the yield point initially, will be permanently elongated. When the temperature has returned to normal, a very significant stress-relief will have been achieved. Repeated trials have given substantial stress reduction; and, under favorable conditions, the stress relaxation was complete.

Thus far, we have mentioned only the longitudinal stress. Reduction of this stress automatically lowers the transverse stress. This stress may be further reduced by heating a triangular area at the end of each plate. The apex of this triangle is on the center line of the weld, and the base on the end of the plate. When this area is heated, it expands against the restraint of the weld. Being near the yield value, the metal upsets in the heated section, and is thereby permanently shortened. A weld specimen that has been treated by the foregoing shows an entirely different

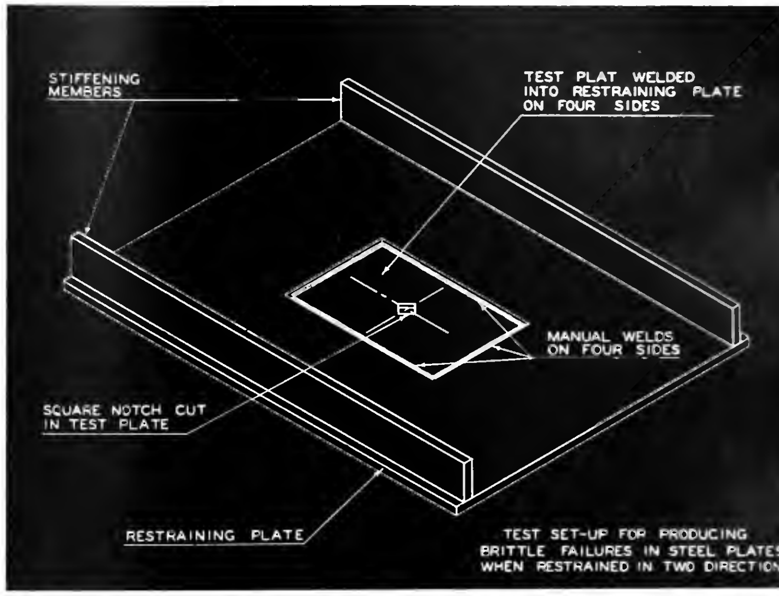


Fig. 2

stress-strain curve than one not so treated. I removed a relieved section about twenty-four inches long, which included a weld parallel to the twenty-four-inch length. The specimen was about two-and-a-half inches wide and three-quarters inch thick. Strain gauges, originally located on the specimen before removal, indicated a relaxation of 37,000 p.s.i. The specimen was put in a tensile-testing machine and loaded, using the original strain gauge to measure the extension. The stress-strain curve is a straight line; the yield value is 50,000 pounds, at which point the gauge failed because of yielding.

A similar specimen, untreated by thermal-loading, did not show a straight line because there was a stress gradient across the piece before loading began; and as each section successively reached yield value, it ceased to follow Hook's law.

Conclusion

From these and other experiments, I would conclude that in an unrestrained plate the longitudinal stresses are near the yield value and unaffected by procedure. The transverse stress in a similar weld is relatively low and is affected by procedure. The longitudinal stress in a weld less than ten inches long, is low. The stress in an externally restrained member varies from a negligible value to the yield point, depending upon the degree of restraint and the length of the member. Proper welding sequence minimizes distortion and determines the availability of energy to propagate a crack. Failure will occur in a region of high local stress. It will propagate itself if the system has sufficient available energy. No system can contain enough energy to produce failure when the steel behaves in a ductile manner. Ship-plate loses this property in the notched condition when the temperature is near freezing. Peening does not reduce longitudinal stress, but does diminish reaction stresses. It is possible to effect a very great reduction in the transverse and longitudinal stress by a low-temperature thermal-loading process.

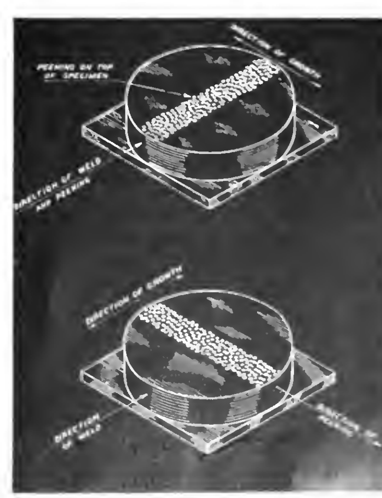


Fig. 3

Pacific World Trade

By T. Douglas MacMullen

Intercoastal Service Demands Attention

Port Cooperation Needed

Ray Burley, traffic manager, McCormick Steamship Company, who recently addressed the Port authorities on the future of intercoastal and coastwise operations.

It is not too early for steamship companies, shippers and port authorities to think seriously about the future of intercoastal services. The intercoastal freight rates are going to be a vital factor in the intercoastal picture, and while the steamship companies might appear to be the principal parties at interest, the issue really involves the railroads, truck lines, port operations and shippers as well.

The old-time theory that any particular interest might ruthlessly undermine existing enterprises by selling at a lower price until control of another's business was obtained and then monopolize the market was supposed to have been out-moded. In the early days of the oil industry this was the accepted practice. The railroads have got by with a similar method against the steamship companies and, for a while, against each other. It was the early day practice on the sea, and so also with many another activity.

Today we see a resurgence of the idea in the fixing of freight rates that will benefit the railroads and undermine the intercoastal steamship companies and the coastwise lines as well. And fresh in the public mind is what seems to be a similar endeavor on the part of the airlines. Seeming benefits to the public have passed for justification of such methods, but sooner or later the economic laws begin to function, prices reach a reasonable level, the strong survive and the weak pass out of the picture.

Public Carriers

In the case of manufacturing or merchandising enterprises, the disadvantage of such evolution is usually merely local in character, and the parties affected, for better or for worse, are limited in number. In the case of the agencies of transportation, however, where the effect is widespread, the entire public should be concerned. Especially is this true where the transportation agency is one that has proved itself to be of vital importance in the national welfare, as the shipping industry has. And still more definitely is it true where the agencies are subject to governmental regulation and control, and where the welfare and even the existence of large areas such as are dependent on our port cities are at stake.

Intercoastal Operations

When intercoastal freight rates, even though highly competitive among the operators themselves, were permitted to find a level of profitable operations the companies flourished, the ports developed, and shippers were able to get their commodities to distant markets at rates that permitted their industries to develop freely. When the rates became subject to political control, however, the picture changed.

Railroad Rates

When the Interstate Commerce Act effectively prohibited lower rates for a longer haul, it was possible for lower cost methods of transportation, such as the steamship companies provided, to gain public favor. But when the railroads were permitted to establish lower rates to points served by steamship companies merely in order to permit the railroads to get business, the steamship companies' position was naturally affected. Theoretically, these competitive rates are supposed to be kept above the point of so-called out-of-pocket cost. The short hauls are not supposed to carry the burden of any part of the lower long hauls. The case for these differentials wore pretty thin, however, during the long years prior to the war, when the railroads were losing money at an enormous rate without interruption. The conclusion is inescapable that the interior areas of the country are paying the bill to permit the railroads to offer rates that will deprive the steamship companies of their reasonable proportion of the freight volume. In the long run, the railroads expected to eliminate water competition, and they have attempted to justify this result in a formal presentation. Little effective opposition has ever been developed by the interior areas, which have not only paid the bill, but have actually been prevented from occupying their proper competitive place in the markets of the nation.

Since the Interstate Commerce Commission now controls all forms of interstate rates, it should be reasonable to expect the Commission to give full weight to the importance of intercoastal steamer transportation and to see that the rail rates are not permitted to affect water competition so as to eliminate it altogether. The trend has been in the latter direction.

The current proceedings through

which the Justice Department criticizes the railroads for combining to maintain rates that are **too high** adds a totally unexpected slant to the structure and one that we are not commenting upon here, except to point out that the defense of the railroads seems to be that the Government itself through the Interstate Commerce Commission has ultimate control of the rate structure.

What to Do?

It would seem that the steamship companies themselves must fight anew to maintain their existence, and in their fight they are entitled to every support from Government agencies in accord with the often-declared policy of Congress that the merchant marine be maintained and developed. Furthermore, the companies are entitled to the active support of shippers in both the coastal and interior regions, because apparent advantages that will disappear if steamship competition is weakened will prove to be boomerangs if their territory is deprived of water competition.

Certain practices directly affecting steamship operations have been permitted to develop without the sturdy opposition which characterized the growth of the steamship business in the past.

For instance, there is the matter of multiple docking in a single port area. The companies have tried to maintain a minimum tonnage figure for which they would shift from pier to pier, or from one town to another in a single harbor. In San Francisco harbor, a ship may move from its home pier to one or more of several specialty piers for small tonnage and then to one or more piers at Oakland. Then there is Richmond and Crockett and Stockton, Sacramento and Pittsburg. Redwood City and Martinez are seeking service, and so it goes. Many of these ports, or subports, could in a cooperative spirit consolidate their tonnage and be served by a single ship, or by a single company. A healthy barge service on inland waterways should be a recognized and valuable adjunct to every harbor area, and it should be brought home to the various Port Authorities that they are not best serving their communities by undermining the prosperity of the steamship operators and thereby endangering the future of the very service on which their industries depend. Professional and corporate and community jealousies too often set up obstacles to their own advancement and existence. These jealousies should be broken down, and a traffic manager, who seeks to promote his own popularity with his company at the expense of a vital national industry, should be checked.

The Panama Canal

When the Panama Canal was projected it was intended that the ships using it should pay for its upkeep. In general this plan has been followed, but new elements have made what was intended to be, and which of course really is, a tremendous asset really assume proportions that have become a burden.

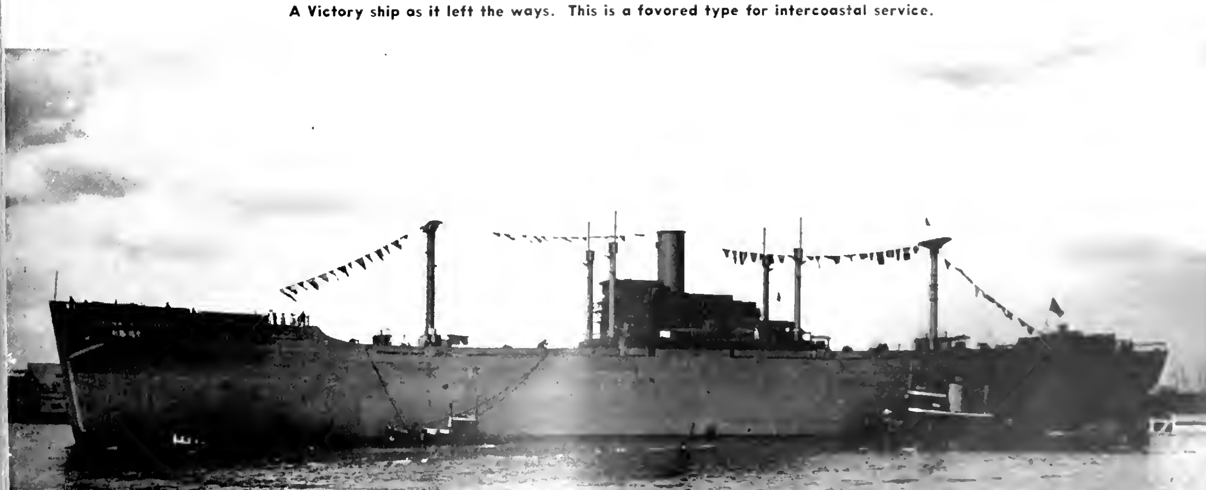
We have never agreed that merchant shipping should be charged with all, or even any part, of the canal costs. Those costs have grown with the years, and tolls which were intended to decrease have remained a burden. Few shippers, and probably none of the general public, realize that the average tolls on a merchant vessel using the canal amount to about $5000 for a single passage.

The Panama Canal is under control of the War Department, and while the Panama Canal Act specified that canal costs should be paid by merchant vessels, it was not contemplated that the canal costs would involve the elaborate defensive system which the Army has set up there, without which the tolls could have been practically eliminated before this time. We say "eliminated" because the canal has income other than tolls, and it should be recognized that the principal beneficiary of the canal is the Government itself, and, through it, the people. Credit should be given the canal for every Government vessel passing through.

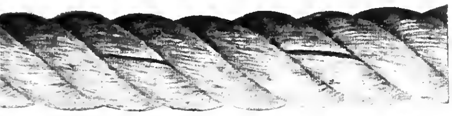
An item of $5000 on an intercoastal voyage is a very material one. It could easily be the difference between profit and loss on the voyage and consequently on the year's operations of the company. Where there are weekly voyages in each direction, the yearly tolls run to a half million dollars, and we have heard little agitation in recent years for the elimination of such an expense.

(Page 88, please)

A Victory ship as it left the ways. This is a favored type for intercoastal service.



Pacific WORLD TRADE



ROPE

A 3-Way World Trade Commodity

To most of us a rope is just a rope. But the particular rope we have in mind will depend on where our interests lie. An acrobat thinks in terms of gymnasiums and circuses. A cowboy thinks of his lariat, a fisherman thinks of his nets, towlines, fish lines and sail rope, and a little girl's only knowledge of rope may be something to jump with. There are shoes made of rope, bell ropes for sextons, and then there are life lines. Someone has even suggested a rope for Hitler. Few of us, however, think beyond some single kind or size of rope.

In a recent publication by the War Production Board, limitations were placed on the uses of rope, and it lists 450 kinds, exclusive of Army and Navy uses.

The use of rope is not new, for in the book of Judges we read, "if they bind me fast with new ropes that never were used, then shall I be weak." To a seaman, rope is one of the most important tools of his trade, and it has been so since Xerxes, during his invasion of Greece (480 B. C.), crossed his army over the Hellespont upon "bridges of boats held together by huge rope cables stretching from shore to shore." According to the historian Herodotus, these cables were constructed of flax and papyrus, and measured 28 inches in circumferance. Primitive peoples in Africa and South America made strong bridges to span deep chasms.

Today rope-making is a major industry. We are interested in it here because of its relation to world shipping, in which it is a very important element, and because it is a manufacturing industry of the Pacific Coast which has an important bearing on the future of trade.

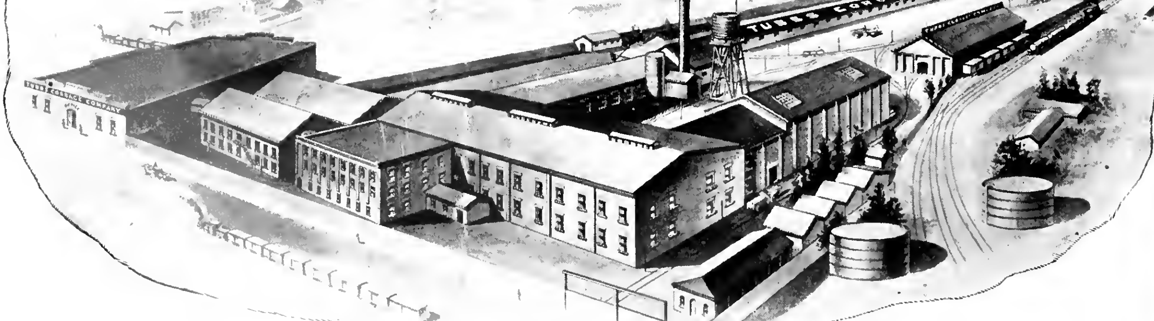
Import—Herman Nichols, vice president of the Tubbs Cordage Company of San Francisco, tells us that the materials used in rope come from almost every part of the world and constitute an important cargo for many vessels. The most important rope material is abaca, commonly referred to as Manila fiber. Coming from the Philippine Islands, there is now a serious shortage in this country, which will become more acute until the end of the war. The world is being canvassed for substitutes.

Herman Nichols, vice president Tubbs Cordage Company and spark plug in the rope industry.

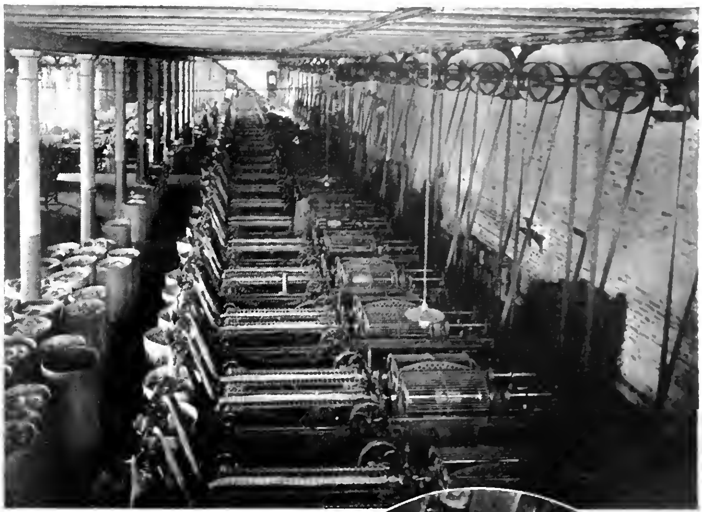
Next in importance to abaca is henequen, sometimes nicknamed sisal. It comes from Yucatan (Mexico) and Cuba. Sisals also are important rope fibers, and are imported principally from Java, Africa and the Bahamas. Jute and cotton are also important, although cotton's principal use as a rope material is in the manufacture of braided cords.

Export—There is scarcely an industry anywhere in the world that does not need rope. This is true in construction, in mining, in fishing, in lumbering, in agriculture, in oil fields and in power development.

Present plant of Tubbs Cordage Company on the site of original mill, shown on opposite page.



Pacific WORLD TRADE

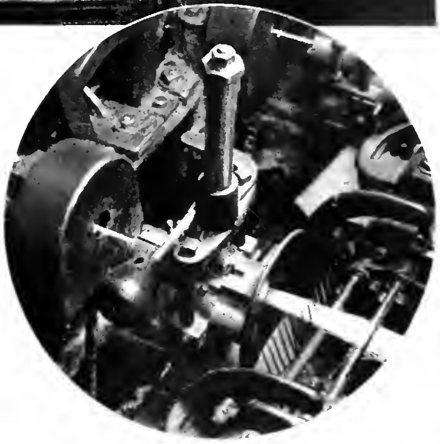


And while it is a product that is made in many parts of the world, it is also a product in which quality counts for very much indeed, and once a reputation is established and maintained, there is a reluctance to change brands. In this industry, more than in most, selling effort once expended has lasting effects. Such an industry has much to think of and plan for the post-war world.

Shipping—To any person who has ever seen a liner like the late President Coolidge entering or leaving a harbor, there may not seem to be very much rope in sight. But a ship of that size and tonnage uses about 22,000 pounds of rope per year, and an all-cargo ship uses about one-third more than a passenger ship for its proportionate size. Rope is the first thing that hits the dock when a ship arrives, and is the last thing to leave, and there are myriad uses throughout the vessel. In the shipping industry the part that rope plays is probably second to none in importance, and here again quality must be maintained.

As an **import** commodity, rope not only provides bulk cargo but it also provides dollar exchange, which in turn results in purchases from us. As an **export** commodity, rope is not only a tonnage item, but it also is a quality item, building for America's trading future. Flag halyard, trolley rope or clothesline, it helps to know the ropes: but as a part of the supply bill for every ship, large and small, rope rounds out a 3-way service to world trade.

Above: Spinning department. Dozens of machines like these comb out the prepared sliver and convert it into rope yarn.

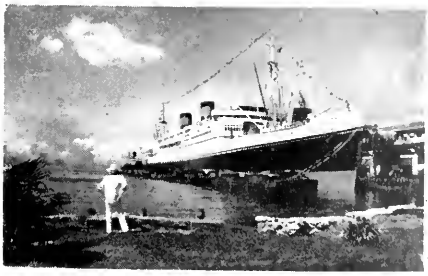


Right: Detailed view of fiber passing from the combing pins into the tube where it is spun into rope yarn.

Seafaring men all over the world will see a familiar set of names on cargo ships when a new series of 125 vessels appears with the names of sailor's knots, according to an announcement from the Maritime Commission.

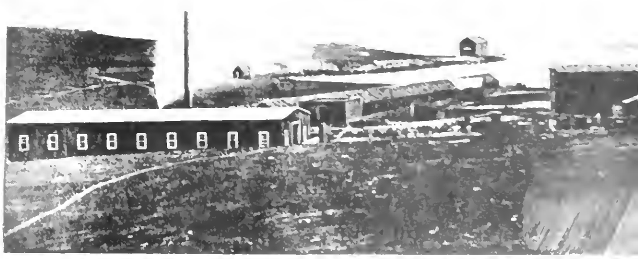
The knots will include such picturesque names as Fishermen's Bend, Turk's Head, Wall & Crown, Spanish Bowline, Square Knot, Long Splice, Sailor's Splice, Stevedore Knot and Hawser Bend, all of them daily terms in the vocabulary of the merchant seaman.

Below: An early scene on San Francisco Bay. It was in sturdy sailing ships like these that Manila fiber was first brought from the Philippines.



Left: Modern Pacific liners use quantities of marine rope. This one used 22,000 lbs. per year.

Right: Early photograph of the original Tubbs Cordage Company mill, established on the shores of San Francisco Bay in 1856. The present mill is in this same location.



Pacific WORLD TRADE

INTERCOASTAL SERVICE

(Continued from page 85)

Like so many other obstacles that confront us through life, the solution is in our own hands. It is true that in the case of canal tolls there are treaties as well as legislation involved, but the United States will never be in a more advantageous position than the present for bringing about a change. This is not said in a spirit of wishing to dominate world shipping, but rather to use the present recognized worth of the shipping industry to lessen some of its hardships.

That the idea is not a new one with this publication, we quote the headline on the leading article in our issue of June, 1912, **"Our ships should go through the Panama Canal free of tolls."** The shipping industry is one that concerns the entire public, and especially the public in the port areas. It should, as we suggested in the beginning, have the active cooperation of the public, the port authorities, and every shipper.

World Trade Money Plentiful

The often-heard expression that post-war trade will be sharply limited because "the world will be broke" is not borne out by fact. The world will not be broke.

At the end of 1941, the amount of gold held outside of the United States was about 10¾ billion dollars. By the end of 1944, the amount will have increased to 15½ billion. At the end of 1941, foreign banking funds in the United States stood at 3½ billion. By the end of 1944 they will have increased to nearly 7 billion. These two amounts total 22½ billion dollars.

During the ten years from 1930 to 1939 our exports totaled 18,578 billion dollars and our imports 15,590 billions. Even if we had no imports at all, we could go a long way on the available 22½ billions, but if we continue in the same proportion as during the most recent decade, with imports running only about 12 per cent below exports, the exchange balances we build up during the forthcoming years will project our export potentialities far into the future.

With the exception of Great Britain, which has a status all its own, all of the allied and associated countries have balances that have been built up in one way or another. For instance, the National City Bank of New York lists gold holdings of certain European countries at the end of 1943 as follows:

Switzerland	964 million
Sweden	384 million
Portugal	161 million
Spain	91 million
France	2000 million
Netherlands	500 million
Belgium	734 million
Roumania	316 million
Czechoslovakia	61 million
Denmark	44 million
Hungary	24 million
Bulgaria	25 million

Some of this gold, especially in the case of neutral Switzerland, reflects the inflow of refugee funds from other parts of Europe. France, Holland, Belgium and others to a lesser degree have been able to conserve very substantial gold holdings abroad. About 8 billion dollars of the gold stored at Fort Knox belongs to foreign countries. France and other countries were able to get very large amounts to North Africa while the getting was good. The Alien Property Custodian in this country who liquidated enemy holdings here has established large credits here, which may be drawn on later. And so it goes with most of the countries in the war zone.

We have imported tremendous quantities of materials from various parts of the world, far in excess of our ability or willingness to export to them during the war period, and the result is a large accumulation of purchasing power in those countries which may be used for purchases here when shipping and other restrictions are removed.

But this is not all. With millions of soldiers in Europe, Asia, Africa, Australia and the Islands of the Sea, the unestimated amounts they have been spending wherever they may be have accumulated purchasing power in dollars which can and will be used for importations later on, and incidentally these same millions of Americans are creating a demand for American products and also developing a measure of familiarity with American products which will not end with the war.

And then there is the post-war period and the financial interchange it will bring. There will be billions of American money invested throughout the world in reconstruction, in development of new resources and for relief. American money will come back to America in the purchase of American goods.

Nor is this all. The development of industrialization in the Orient and in Central and South America will be the means of creating new wealth in those countries. The amount of newly-mined gold in many of them is very large, and the products of certain countries—China, for instance—may be shipped to other countries where a surplus of exchange is available, thereby benefiting every country involved in the chain of transactions.

Over and above all this is whatever may develop from the recent World Monetary Conference, which proposes the establishment of vast credits which may be used or borrowed by the countries needing exchange.

The net result of this showing is that "poor" countries are relatively few, and the total of usable credits is enough to assure a long period of prosperity for foreign traders and for any industry in the United States that has,or **will develop,** exportable commodities.

There are three important matters not mentioned at length herein, but which will be covered in subsequent articles. One of these is Great Britain; another is the enemy countries; and the third is restoration of importations of such items as rubber and silk. Russia is also an important figure in the future of world trade, but one that we can only speculate about at this time.

Air Rates & Fantasy

If there is one single thing the airline applicants need not fear, it is any hint of conspiracy to fix uniform rates. There is no uniformity.

Freight and passenger rates are fundamentals of transportation. They are just about the most important elements in the business, and, if they are either too high or too low, may wreck it.

In the applications now pending before the Civil Aeronautics Board there are rates suggested in the exhibits which would seem to have been arrived at through means other than those which the applicants would like to see followed by reasonable competition. The object would seem to have been the gaining of public attention through spectacular announcements, rather than the actual solicitation of traffic at such figures.

To be specific, the Matson Navigation Company's proposed passenger rates to Hawaii are $175 to $200 or $315 to $360 for a round trip. Pan American Airways offer a rate of $96 one way, or $172.80 round trip. The average prices for Matson are more than double those of Pan American. At first glance one might think that the airline knows rates and the steamship company does not. But immediately we are slapped with a United Airlines' proposal of $125, which dangles somewhat between the two, and there are just as many different rates as there are applicants.

The same is true of freight rates. One airline proposes a rate that is less than one-third of that of the highest offer.

Sound Rate Basis Is Important

Sound passenger and freight rates are not picked out of the air, but are either the result of experience or of a careful calculation of all of the cost factors involved. If the rates are not sound, the business will not be sound and the service will be discredited. There have been many transportation companies of every possible type that have ended in failure because of an improper rate structure.

We hope the air rates over the Pacific will be low. But more important than low rates is the public repute in which travel and trade should be held, so it is better that rates be high enough to permit reductions rather than low enough to require advances.

Rates are built on definite factors of cost. The investment involved in equipment in ground facilities and in services of various kinds is one factor; another is the operational expense, including payrolls, supplies, replacements, promotion and insurance. Then there are factors of uncertainty which must be protected against. The first element of uncertainty that occurs to the public mind is the weather. It is a very important one, and may keep the equipment grounded or in danger. To any transportation man, however, the element of uncertainty that he thinks of most is probably the unbalance of traffic. It is true that an airline may have more flexible facilities than, for instance, a steamship line for handling larger or smaller cargoes, but an airline has a disadvantage of very high cost and very high running expense per operating unit. A plane that must return empty puts a burden on the entire rate structure. Experience has shown that in transportation it is not possible to foresee every contingency. For instance, the railroad systems of the United States have had more ups and downs than their share, and if there is any one thing that they have plenty of it is experience. Recently C. E. Johnston, chairman Western Association of Railway Executives, made some interesting comparisons. Right now the railroad business is good. It was twice as good during the first four months of this year as it was during the first four months of 1929. In fact, for twice as much transportation they took in more than **one thousand million** dollars more, but had three million dollars less in net operative income. Their average revenue per ton-mile in the first quarter of 1944 was 12 per cent less than in 1929, and their average revenue per passenger mile was 36½ per cent less. Increased operating efficiency enabled the railroads to perform nearly 60 per cent more freight service in 1943 than in 1929 with 485,000 fewer freight cars to work with.

Railroads have certain advantages that airlines and steamer lines do not have where operating revenue is concerned. For instance a very large item in railroad revenue is demurrage; that is, fees for delay in unloading freight cars. Railroads can add to or shorten trains to accommodate the load. They can adjust their rates to meet water competition. They can deliver freight right within a city's industrial area. And they can apply commodity rates and use many types of equipment for special kinds of freight. Airline operations are at this time rather fixed, especially in overseas operations where the ports of call are few in number and likely to be out of easy range of freight and passenger handling facilities. Furthermore, the rate of pay for air crews is large. The captain's nine-hundred-odd dollars per month might cover the pay of an entire crew on a freight train.

An examination of the exhibits presented by Matson to the CAB discloses a set of rates that are carefully arrived at by the inclusion of all possible costs, with the intention of at least starting operations on a sound basis. If a certain service costs more, the rate for it is higher and it is not left for the lower priced services or for capital investment to pay for it. An example of this is the difference between the daytime and nighttime rates to Honolulu. The day rate is $175 and the night rate $200, the reason being that in the night plane berths are provided, which reduces the plane's capacity by one-half. In the Matson program, the rates are built up from costs and it is readily determined that a certain amount of traffic will be needed to pay for the operations. The only problem remaining is the development of that amount of traffic, and it is left to the applicant's sales and advertising organization to accomplish that result.

There are many items in the cost set-up that may show possibilities for reductions after a short time, and it is safe to say that the public will be given the benefit of savings because it is natural to expect travel to increase as rates are lowered. The public has a wholesome respect for Matson's methods of successful operations, which have in the past developed not only their surface transportation services but also the industries and territories they serve.

Pacific World Trade

Mexico's Industrial Development Offers Trading Future

There are two countries whose trading status differs from that of the rest of the world because they are accessible by land routes while all others must be reached by water. Of these two, Canada will be dealt with in another issue; our business with Canada is just about as important as any in the world.

When the Spaniards first landed on the unexplored coast around Vera Cruz, they found a fabulous country. Mexico is still a fabulous country. She is our neighbor who lives next door but whom we have scarcely met, although the thin brown stream of the Rio Grande is all that divides her physically from us.

Mexico is sophisticated. She is primitive. She is religious. She is pagan in her feelings for the soil. And she is modern. In fact Mexico's geography and her products are more varied than those of any area of similar size in the world. These products range from hemp to gold, from copper to coffee, from petroleum to castor oil. Her climate ranges from the tropical jungles to the high invigorating air of her great plateau, in the center of which, at 7400 feet, is Mexico City.

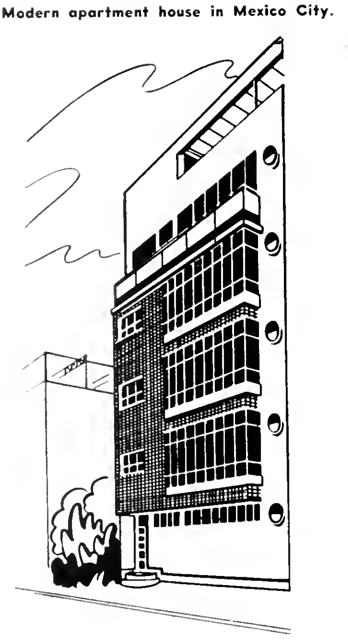
Except in a tourist tract, a country gets into the news only when it steps out of a rut. Conditions in Mexico, except for periodic revolutions, had not varied greatly in a thousand years. This does not relate to the social affairs of Mexico but rather to the actual industrial conditions. Within recent years there has been a tendency toward industrialization which has had the effect of lessening the dependence of the people on their agricultural system, and as the number of industrial products increased the volume of imports and exports increased, and this flow, with a consequent raising of living standards, is reaching the proportions of a flood.

Last month Secretary Hull and Mexican Foreign Minister Padilla issued a statement outlining elaborate plans for the industrialization of Mexico which has already resulted in foreign trade inquiries from both importing and exporting interests who see in the program the best prospects for trade that have ever existed between the countries and which may compare favorably with those of any other country in the world.

Increasing attention is being given to every industrialization possibility, regardless of its size or importance. Every railroad or highway extension opens up new markets, and this is true also of the rapidly expanding airlines in Mexico.

With a concentration on industrial planning along lines that will harmonize with industrial plans for the United States, so as to make interchange of commodities beneficial to both rather than merely competitive, it is thought in Washington that relationships between the two countries have advanced a very long way, and in the right direction.

Modern apartment house in Mexico City.



Like most other countries, Mexico has at present a very large dollar exchange balance with which to buy from this country as rapidly as materials become available, and already importations have greatly increased. In 1940 Mexico's imports from the United States totaled $97,600,000, which was about 79 per cent of her imports from all countries. In 1941 the figure had increased to $158,700,000, which was more than 84 per cent of imports from all countries.

Mexico has many things to export, and in most of them we have a lively interest. In addition to the old-established coffee, rubber, silver and copper production, there is now an increasing production of exportable textiles, chemicals, petroleum, metals and foodstuffs. Most important, perhaps, are certain metals and minerals, such as antimony, of which Latin America provides 58½ per cent of the world's production; graphite, mercury, zinc, copper and lead. Mexico's importations from the United States, as industrialization increases, include coke for steel, soda for glass, chemicals for textiles, motors and vehicles and machines for farms, factories and ships. Orders are piling up for the shipment of consumer goods as they become available. These include, as might be expected, most of the things that have been off the market for several years, such as automobiles, home appliances, agricultural equipment, office supplies, canned goods,, clothing and shoes, and many others. At home we find merely a normal accumulation of unfilled orders, but in Mexico there is a **multiplied** demand due to increasingly high standards of living, because of increasing prosperity, increasing education, increasing land ownership —and increased confidence in the future.

Foreign Trade Promotion Urged in San Francisco

Noting that "a great many business men in this country, as well as the majority of the general public, are little aware of the fact that the maintenance of the standard of living commensurate with the large resources of this country is dependent upon the volume of our foreign trade," the San Francisco Chamber of Commerce has approved and pass-

Pacific WORLD TRADE

William L. Montgomery, manager, World Trade Department, San Francisco Chamber of Commerce.

es on to its membership the following recommendation:

"In order to bring about a better understanding of the abovementioned fact, we recommend that comprehensive educational programs on a national scale be adopted and carried out by all foreign trade organizations and kindred groups in this country.

"Emphasis should be laid upon the necessity of holding production costs within the range of international cost levels in order to insure a maximum volume of export trade for the United States and thereby promote our own economic welfare.

"Equal stress should be laid on imports from foreign countries as the most effective means of providing the countries of supply with the necessary dollar exchange to pay for our exports to them. The United States being a creditor nation, imports are indespensible for correcting our presently unbalanced international credit position."

Ports of Embarkation Projected

Beyond War's End

A series of industrial establishments that are probably more elaborate than those of any commercial activities, the Ports of Embarkation set up and operated by the Army Transportation Corps are likely to remain as a permanent part of the industrial set-up in the leading Coast cities of the country for a long time to come. In several of them there are Army installations that will probably be permanent. In all of them the shipping and warehousing facilities that have been installed will be too important to discard.

With the war picture still uncompleted, we will look for a moment at what these facilities have meant. From December, 1941, through June, 1944, more than 4,000,000 soldiers and 63,000,000 tons of supplies were transferred from the United States to 127 overseas ports throughout the world. To Europe alone the cargo tonnage has been twice the 8,900,000 tons sent to the AEF in World War I. For a while, as the offensives were getting under way, there were 7½ ship tons for every soldier going overseas and more than one ship ton for every man already overseas.

In the shipping world, the habit develops of thinking of everything in terms of ships and tons and too little in terms of men. When we think of the work of the Army Transportation Corps, however, the men are soldiers—the same soldiers as those whose work appears in the headlines and whose names appear in the casualty lists. So Ports of Embarkation are more than shipping points—they are war theaters.

Captured ports are operated by transportation officers, who are responsible for keeping supplies flowing up to the fronts. The Transportation Corps operates the hospital ships, of which there will be 24 at sea by the end of 1944, and on land the Corps has used to date about 220,000 railroad coaches, 350,000 sleeping cars, 120,000 baggage and kitchen cars and 170,000 refrigerator and freight cars for its troop-moving activities. An average of 34 cars is required for each 1000 men moved.

The Transportation Corps has a total military and civilian personnel strength of more than 350,000, many of them transportation specialists. The military personnel accounts for 277,655, more than the entire pre-war regular army.

When General Kells took charge of the San Francisco Port, he stated that an early end of the war in Europe probably will not change the picture here very much. Ports on the East Coast will seek to return to peacetime business as soon as possible, but the armies which we have in Europe cannot be moved back overnight. It took two years to get them there and will probably take a year and a half to get them back.

The West Coast ports will have to carry the entire war supply load without help from the East, and as efforts are made to restore commercial shipping the Ports of Embarkation will be needed more than ever for probably at least five years, regardless of the war's end.

Brigadier General C. H. Kells, Commanding General of the San Francisco Port of Embarkation.

Side launching without the "snubbing" line.

Snubbing Control of Side Launching

Mr. Kiberle, yard superintendent of Western Pipe and Steel Company at South San Francisco, and his staff, have developed a unique method of controlling their ships immediately after they have been launched sideways.

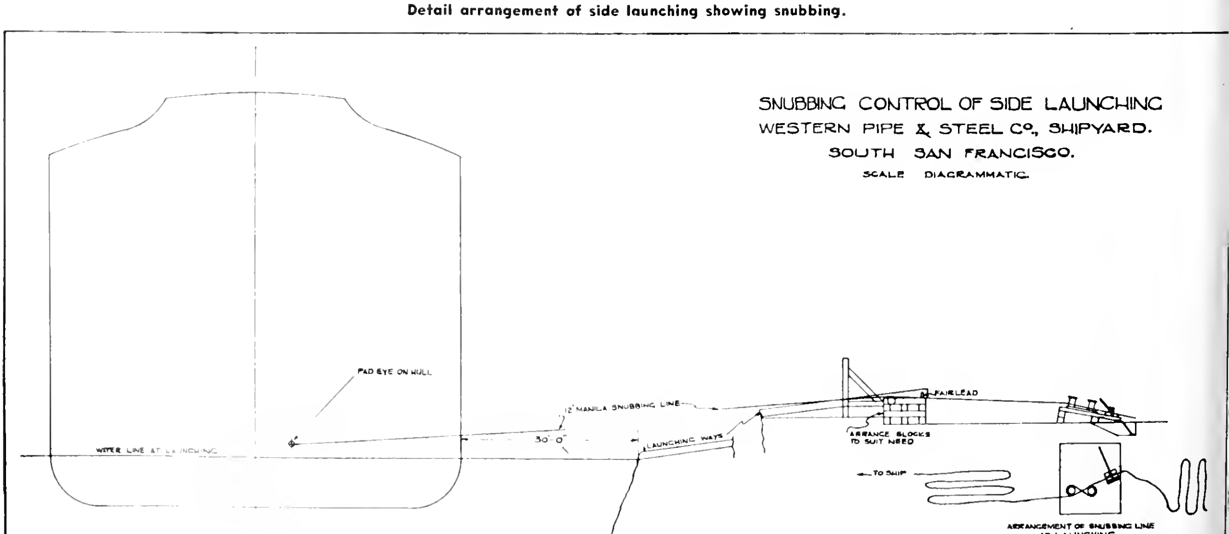
Until two years ago, all their ships were launched with a pair of heavy manila mooring lines fastened to bollards forward and a pair fastened aft. These two pairs of lines were led and fastened to bollards conveniently located on shore, but enough slack was left on these lines to allow the ship the necessary freedom to roll. The result was that the ship continued to roll and drift across the launching basin, sometimes touching the ban on the other side, before bein brought under control.

This danger has now been prac tically eliminated by the use of th arrangement as shown in the deta drawing. Two 12″ manila dragline with shackles on one end are secure to eyeplates welded to the hull, on at the fore end of the ship and an other aft, in a position about eight t ten feet above the keel line. Thes lines are led over separate rollers i position as shown, and thence to sep arate bollards which are convenientl located and fastened on shore. Afte making several turns around thes bollards the lines are then led to "snubbing" device located about fou feet from the end of the bollards.

This "snubbing" device consists o a six foot length of a steel flat ba 4″ x ⅝″ in section, which hinges o a pin fastened in a slot in a shor length of 4″ diameter pipe placed in vertical position, and welded on bot tom diameter to a ⅝″ base plate About 7″ off, welded in a simila position, is another short length o 4″ diameter pipe slotted on both side sufficiently to receive the 4″ x ⅝ flat bar, as it is lowered in positio by the men operating same. Betwee these two vertical pipes is a piece o grooved hardwood fastened to bas plate through which runs the manil line. Four men operate the device b bringing the lever to bear down o the rope, thereby "snubbing" th line.

The working effect of this whol arrangement is such that the ship nov comes to a standstill about 30 fee from the end of the ways, and th

Detail arrangement of side launching showing snubbing.



Side launching with "snubbing" line.

amount of rolling has been reduced to an absolute minimum.

In the adjoining photograph showing the launching of the American Press, the taut mooring manila lines from the shore to the ship's bollards aft are discernible. The other picture of a more recent ship launching shows two mooring lines from shore to the forecastle, in quite a slack condition; also the "snubbing" line, which can be observed about ten feet above the waterline at the stem, is already in operation, as seen by its taut condition. More detailed arrangement is shown in the drawing.

Moore-Built Vessel Fires First Shot

The first shot to resound from an American ship during the Pearl Harbor attack is reported to have been fired from the U.S.S. Tangier, a seaplane tender built by Moore Dry Dock Company of Oakland, California.

Anchored in Pearl Harbor on December 7, 1941, the Tangier had moved into the position formerly occupied by a larger vessel. Whether the Jap bombs aimed at her were intended for the other ship or were fired indiscriminately, they fell short of their mark, and the crew of the Tangier retaliated swiftly with an answering volley at the first wave of attackers. The story is now told since the lifting of the Naval censorship ban.

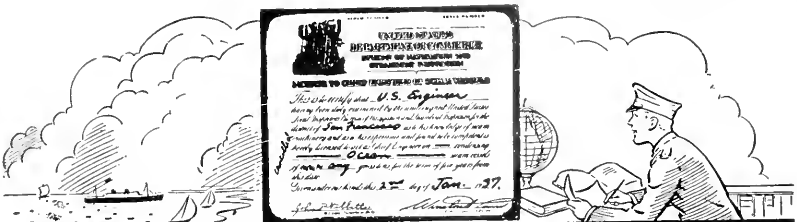
Before the renamed Tangier was converted to a seaplane tender for the Navy in August, 1941, she was launched as the S.S. Sea Arrow at Moore's on September 14, 1939. A C-3 type cargo vessel, she was delivered on July 8, 1940. She had a capacity for 12,000 total deadweight tons and was driven by an 8500-shaft-horsepower double reduction geared turbine.

Since Pearl Harbor, the Tangier has been in continuous service and has undertaken important missions in the South Pacific. Several times she has returned to Moore's for minor repairs.

When launched at Moore Dry Dock Company, the vessel was christened by Mrs. Joseph Sheehan, wife of the late president of the American President Lines.

Oddly enough, a picture of the Tangier shown in a copy of Life Magazine was taken by a Japanese photographer and reproduced from a German publication.

U.S.S. Tangier (former Sea Arrow). (Official U. S. Navy photo)



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco 11, California

Steering Mechanisms

II—STEERING GEAR

In the last article, the speed-torque characteristics of the steering gear requirements were discuscsed. The attempt was made to show that the constant speed or constant torque engine or motor did not make an economical drive for the rudder.

The constant horsepower drive at variable speed will now be discussed. While the steam engine is in a sense variable and adjustable speed is characteristic, it is still limited in torque and does not have the ability to increase torque at the expense of reduced speed. The motor is even more limited in this respect. What is needed is a device which, when reduced speed is permissible, will increase torque available in proportion, so that at any speed within its range, the product of its output speed and its torque will be the same. That is, if the speed is halved the available torque is doubled.

While this particular characteristic cannot be obtained in an engine or motor within present conventional design, it can be obtained by interposing a special hydraulic drive in between a constant speed motor drive and the rudder mechanism.

Special note: To those readers who may be more familiar with electrical machines, it should be indicated that the limitations of the motor are largely dictated by the power system to which it is attached. Thus, with either a.c. or d.c., a constant voltage system (generators hold nearly constant voltage with change of load from zero to overload) lends itself to nearly constant speed motors. A constant current system would lend itself to the variable speed, variable torque, and perhaps constant horsepower motor drive. This system is one having generators whose characteristics are such as to cause the generated voltage to vary from zero to full or over voltage values as the load varies, and which changes its voltage always to cause a constant value of current to flow.

In this case, to stop a motor it would be short circuited with a switch. The current flowing at normal value through the switch. By opening the switch, the current flows through the motor, and as the motor speed comes up its voltage increases until the load torque equals the motor torque. A series motor would have to be used. All motors would have to be connected in series with all other loads. Strange as it may seem, this constant current system was popular in the early days of electric power in European countries, and in the U. S. A. it is still used for street lighting systems.

The variable torque, variable speed, constant horsepower hydraulic mechanism is known by several names, and has a great many marine uses besides steering gear, particularly aboard naval vessels. A very popular and well-known form is the Waterbury Universal Delivery Pump, or the Waterbury Variable Stroke Pump, and Variable Speed Transmission. Basic designs are by the Waterbury Tool Division of Vickers Incorporated, Waterbury, Connecticut. Another well-known form of this variable adjustable stroke pump is the Heleshaw design. These designs may be manufactured by many different machinery builders, but with the necessary manufacturing rights by arrangement.

Some of the characteristics of such a pump are:

Driven at nearly constant speed by motor or engine.

Running all the time even when no delivery is wanted.

Delivers fluid—usually a light oil—under pressure at one opening, and receives it back at another opening at exactly the same rate of flow.

Under control, causes either of these two openings or ports to be pressure and the other suction. To push and pull and in either direction.

Under control to cause only the very slightest rate of flow, or zero flow, or to flow at the maximum rate.

And most important of all, when only small flow is needed to have its maximum pressure capacity. This means, of course, that at maximum flow it has its minimum pressure capacity. This imposes constant horsepower load on its drive motor.

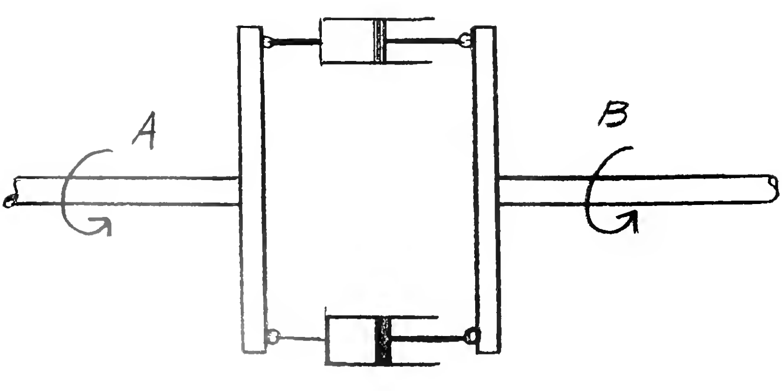


Fig. 1

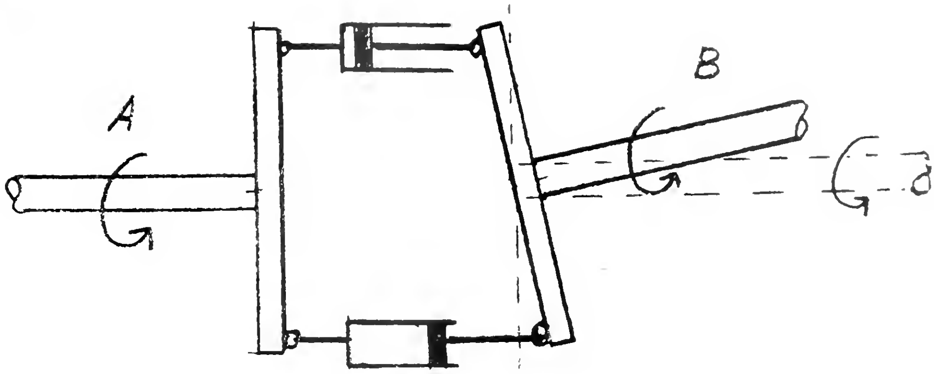


Fig. 2

It should be noted that variable flow could be had from a centrifugal pump by throttling; and to get pressure or suction on a pair of pipes, a four-way valve could be used. But at minimum flow we would not have a very high pressure, such that rate of flow times pressure is a constant value.

The pump definitely must be a positive displacement type, and therefore must be a piston pump with a variable adjustable length of stroke. It would not do to adjust the length of the stroke by operating the piston from a cam on a rotating shaft, and shortening the stroke by holding the piston off from the cam an adjustable amount. This would not increase the mechanical advantage ratio of the piston to the drive shaft at short pump strokes, nor would it give a long pump stroke at a low mechanical advantage. It is necessary that the rotating shaft do work throughout the entire revolution.

Such a positive displacement variable stroke piston pump could be made as indicated in Fig. 1.

Suppose a pair of bicycle wheels were mounted on individual shafts A and B, so that the shafts are concentric in alignment and the center lines are parallel. Two or more bicycle pumps could be connected to the rims of the wheels as indicated in the figures. The two shafts are now driven from one power source, such that they rotate exactly together. As shown in Fig. 1, there will be no movement of the pistons with respect to the cylinders, and we have zero displacement and no power drawn from the motor except for friction.

If now, as shown in Fig. 2, the axis of rotation of shaft B be moved at an angle from its parallel position, then as they both turn there will be displacement of the pistons and pumping action. Furthermore, and of great importance, note that at a slight angle only the displacement is slight and here the mechanical advantage is high.

This means that at the expense of only normal torque or turning effort on the shafts, we may have great and maximum force on the piston, and therefore maximum pressure. Conversely, at a large angle of tilt of shaft B we have maximum piston displacement, but at our limited normal torque we obtain only limited or minimum piston force and hydraulic pressure.

It is this change in mechanical advantage between the drive and the piston pump which characterizes this hydraulic mechanism. The scheme shown in Fig. 1 and Fig. 2 is entirely impractical, of course, because there must be means to keep the two wheels together to deliver and remove oil from the several cylinders and other mechanical problems.

(Continued in October)

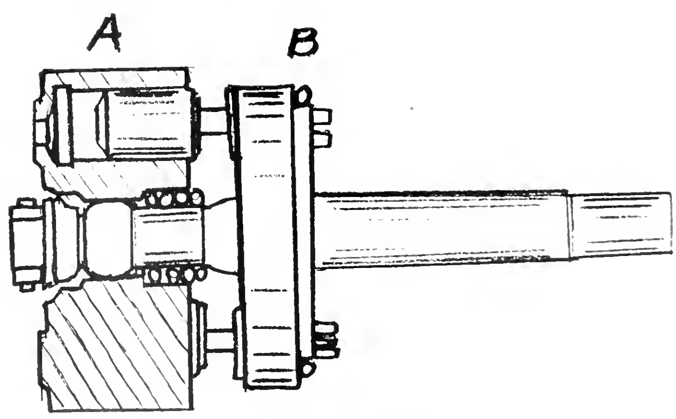


Fig. 3: Rotating Elements

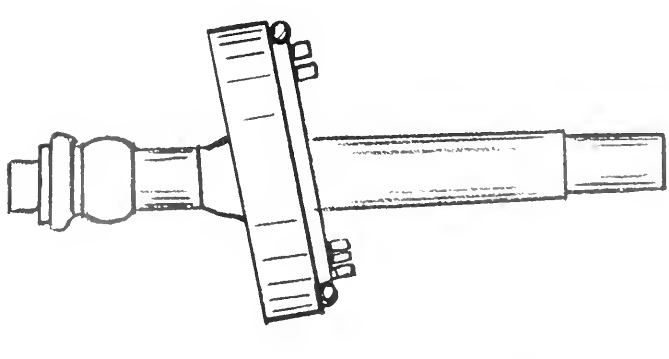


Fig. 4: Socket ring or tilting thrust plate shown tilted.

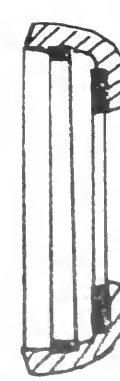
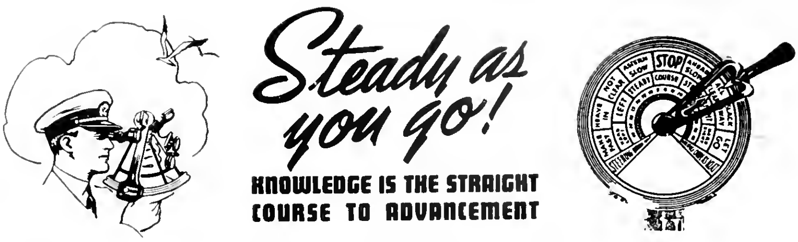


Fig. 5 Tilting Box



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

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Vision at Night

The lookout system aboard ship functions 24 hours a day. Its efficiency is greatly impaired at night by the fact that the human eye has certain inherent limitations. However, a little knowledge of the eye and its functions will serve to improve the ability of observers immensely.

The eye is somewhat complex but may be considered essentially an apparatus very similar to a camera. The pupil is the entrance for light and the retina the sensitive lining on which the picture forms. The retina is composed of two kinds of cells that function under different conditions and in different ways. This difference of conditions is in the matter of illumination. One cell for reception in bright illuminations is the "cone cell." The other kind is operative in darkness, and is the "rod cell." Both kinds are scattered about the retina, but there is one small area, called the center of vision, where myriads of cones are collected into a compact group. This is where an image falls when one looks directly at an object in the daytime. Here the image is most distinct when illuminated sufficiently to affect the cone cells. Images falling elsewhere on the retina than on the center of vision are perceived by the more scattered cones and are indistinctly seen. This is what is referred to as seeing out of the corner of the eye. This, then, is vision in daylight or equivalent bright light.

In the dark or when the illumination is less than that of a starry moonless night, only the rod cells are capable of seeing. They are many times as sensitive as the cones, and are seemingly paralyzed by strong light. As the illumination decreases this paralysis decreases and finally when the light becomes too little to affect the cones the rods are back to normal and able to take over.

As we have seen, there are no rods at the center of vision, so looking directly at an object and thus having the image fall on this center means that it does not influence any rod cells. Accordingly, when the illumination is low no image will be seen. But if the eye is turned slightly away from the object, the image strikes away from this center and stimulates the scattered rods. It then becomes visible.

A second important point about vision at night is the fact that eyes are most sensitive just after they stop moving. Therefore lookouts should scan the horizon or sky in systematic short jumps. In looking at an object, repeatedly moving the eyes to positions just slightly aside it and in this way circumscribing a circle about it will give the clearest image.

A third fact to remember is the absence of color perception by the rod cells. At night, therefore, things appear dark and will be visible only by the contrast of shading between the object and its background.

It is thus seen only in silhouette, and matters of distance, size, etc., are indistinct. In fact night vision is about as clear as seeing out of the corner of the eye in the daylight. It is natural to try to improve this indistinctness by looking directly at the object as one would if it were well illuminated. As we have seen, however, this does not work at night. Instead of becoming more distinct the object may not be seen at all.

The change in the rod cells from complete paralysis in strong light to the ability to "see" in poor illumination is called "dark adaptation." It takes about 30 minutes in complete darkness to acquire this adaptation. Consequently for the protection of the ship, lookouts should be dark adapted **before** going on watch. Otherwise their value is nil for most of this adaptation period.

Rarely the ability of the rod cells to adapt may be lost and the person will be blind at night. Such night blindness is due chiefly to a lack of vitamin "A." This vitamin is normally derived from yellow and green leafy vegetables, liver, cheese, and butter. It may also be obtained, in the absence of a well-rounded diet, from artificial sources, such as cod liver oil or vitamin capsules.

Once dark adaptation is obtained it must be protected by avoiding exposure to bright light. Failure of lookouts to do this results in temporary night blindness, and during the period of readaptation the ship will be without protection just as when they go on watch unadapted to darkness.

In some situations, especially in the case of officers on watch, it is necessary to read instruments, charts, etc. Dark adaptation may be maintained if the illumination used is weak and preferably red in color. Red light affects the vision cells least, while blue affects them most. Hence, red light cannot be detected from as far off as blue, and it is to be preferred for these reasons of security as well as for the greater dark adaptation protection. Closing one eye even in a fairly strong light will also protect its adaptation.

In summary then, this advice for improving vision at night may be given from the data outlined:

(1) Maintain an adequate intake of vitamin "A" in the diet.

(2) Become used to seeing in the dark (dark adapted) before going on watch at night.

(3) Learn to avoid looking directly at objects. Look only close to them at night and expect to see only a dark silhouette. At best this will appear indistinct.

(4) Since the eyes "see" more at night just after having been moved, lookouts should sweep their gaze over overlapping segments of the horizon in short jumps. In looking at a specific object these jumps should describe a circle around it. Each short segment (or jump) should be just to one side of the object to cast the image away from the center of vision.

(5) Maintain dark adaptation by illuminating charts, etc., as necessary with a weak red light. Keeping one eye closed will maintain its adaptation even in a fairly strong light.

(Proceedings of the Merchant Marine Council, U. S. Coast Guard.)

Lateral Aids to Be Standardized

A program for the further standardization of the flashing characteristics of lighted buoys and minor lights used as lateral aids to navigation, has just been inaugurated by headquarters. Under this program, the number of flashing characteristics permissible for aids of this type will be reduced to approximately 10, as a means of improving these aids from the point of view of the mariner.

Up to the present time there has been a considerable variation in the light characteristics for lighted buoys and minor lights, partly justified by their use for varying purposes. In reducing the number of approved charactertistics, standardization will not be applied to those aids where it is important that special characteristics be adopted for specific reasons or special purposes. Neither will it eliminate the special light characteristics already adopted for the purpose of indicating obstructions, sudden constrictions of channels, sharp turns in fairways, and such positions as mid-channel and junctions.

It is generally recognized that for the proper impression of the light on the eye, no time period of light should be less than 0.3 seconds with 0.4 seconds duration and 0.5 seconds duration being better in the reverse order as named. With this in mind the standard characteristics which were established by Headquarters are as follows:

Fixed.—For use where commercial current is available, and where there is no difficulty in distinguishing such lights against the background of other lights. Fixed lights operated on electric batteries or acetylene gas may be justified by the importance of the location.

0.5 Seconds Light 2.0 Seconds Dark.—For use along the sides of channels where the importance of vessel traffic and available servicing facilities warrant and make possible frequently repeated flashes.

0.4 Seconds Light 3.6 Seconds Dark.—For use along the sides of channels where vessel traffic is not heavy.

1.0 to 2.0 Seconds Light 4.0 to 9.0 Seconds Dark.—These characteristics are for use on seacoast and approach buoys, isolated minor fixed aids of similar nature, or where there is need for a longer light period to facilitate the taking of bearings.

(Coast Guard Bulletin)

Skipper's Technical Library

More efficient operation of the merchant marine is anticipated through use of a "Captain's Technical Library," now being placed on each merchant ship of U.S.M.C.

Recommended by the Crews' Quarters Committee, a group of 28 technical publications has been selected for the library.

Texts chosen were designed to be of assistance to captains in wartime operation of merchant vessels. Ready reference is provided on many important subjects affecting the ships of the merchant marine.

The initial selection of standard books for the library includes:

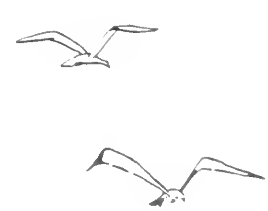
"Standard Seamanship for the Merchant Service," by F. Riesenberg; "Robinson on Admiralty"; "The Raft," H. Gaty; "Pacific Hand Book," E. G. Mears; "Weather Around the World," I. R. Tannehill; Bible (large print); "Master's and Mate's Manual of Naval Architecture," Manning; "Oil Tanker Operation," Hillman (for oil tanker library only); "Medical Care for Seamen at Sea," W. L. Wheeler; "Seamen's Wage Computer Tables," B. Martin.

The following publications printed by the Government Printing Office were also included:

"U. S. Navigation Laws," "Modern Ship Stowage," "Load Lines," "Manual for Safe Handling of Inflammable and Combustible Liquids," "Buoys in Waters of the U. S.," "Aids to Marine Navigation," "Pilot Rules for Inland Waters Coast and Gulf," "Rules of the Road," "Laws Governing Marine Inspection," and "General Rules and Regulations Prescribed by BMIN for Ocean and Coastwise." "Manual of Shipping Economics" and "Form Manual Used in Shipping," not as yet published, will also be in the ship's library.

Among the books and pamphlets issued by the Hydrographic Office and the U. S. Coast Guard and included in the library are:

"Bowditch," "Table of Distances," "Catalog of H. O. Charts," "Catalog of USCGS Charts," Four nautical almanacs, "Azimuth Tables," and "H. O. Complete Set of Number 214."



Report on the American Shipbuilding Industry

By J. Lewis Luckenbach

At our last meeting a report was submitted to the Board on structural failures being experienced on our welded ships. That no serious failures have been reported for some time is in a large measure due to the better weather and temperature conditions prevailing during the summer season, although we have every reason to believe that the corrective measures being carried out on these ships as opportunity affords have also been instrumental in preventing such casualties. The reports of the Senate and House Committees which investigated the structural failures on welded ships have now been published and the interim report of the Board appointed by the late Secretary Knox to investigate the design and methods of construction of welded steel merchant vessels has also been released for publication.

Welding Problems

The large amount of investigation work now under way in connection with welding problems is making satisfactory progress. Most of this welding research is under the auspices of the National Defense Research Committee with funds provided by the Government and by the Welding Research Council, but some of the projects are being sponsored by the Maritime Commission and the Navy Department. Important investigation work is also being carried out by some of our private shipbuilders, by the steel manufacutrers and the Bureau staff in our own laboratory. A special Sub-Committee of the Board to Investigate the Design and Methods of Construction of Welded Steel Merchant Vessels has recently been appointed for the purpose of correlating all the various welding research projects now under way. The Bureau is represented on this and other committees, and our contribution to these important activities adds to the work of an already overburdened Technical Staff. In order to help out in this situation, the services of Dr. Wendell F. Hess of Rensselaer Polytechnic Institute have been retained by the Bureau as a consultant on matters relating to welding research.

Merchant Ship Production

Production of merchant types of seagoing vessels over 2000 gross tons by American shipyards during the first six months of 1944 has about equaled the results achieved during the first six months of 1943. However, the production is not comparable with the outstanding record in the latter half of 1943. The tremendous production in the last six months of 1943 will no doubt stand as an all-time high in the world history of shipbuilding. This rapid rate of construction would have continued into the present year were it not for the curbing of overtime and the necessity for changing over from the comparatively simple type of Liberty ship to the more involved Victory type. The transition, however, has been accomplished with the minimum of lost time, so that by the end of this year American shipyards will have completed a record number of high speed competitive types of merchantmen.

Between January 1 and June 30, American shipyards completed 723 large merchant ships of 5,606,112 gross tons and a deadweight carrying capacity of 8,239,234 tons, having propulsion machinery totaling 3,321,960 horsepower. American merchant ship production, 1939 to date, has reached a total of 3284 vessels of 24,979,476 gross tons, 36,731,891 deadweight tons, and 12,773,812 horsepower. This merchant fleet produced almost entirely in the midst of a war is almost three times greater in number than what existed under the American flag in 1939, and almost four times greater in gross tonnage and deadweight. Deducting war losses of American flag tonnage, we now have merchant vessels double in number and tonnage than what existed pre-war under the British flag, at that time the first ranking maritime nation. In fact, our fleet now is approximately equal to one-half of the pre-war world tonnage. Deducting world sinkings, America now owns the major part of world merchant tonnage.

In new construction, the trend is toward larger vessels with greater carrying capacity and more speed. The average ship built in the last war was 5100 gross tons and the present average is about 7600 gross tons. Exclusive of Liberty ships, they have greatly increased horsepowers and more than 50 per cent greater speed. Most of the vessels being built today will provide valuable earning tools in the post-war period.

Liberty Ships

Of the total production for the first six months of 1944, 586 vessels of 4,241,663 gross tons and 6,128,988 deadweight tons were cargo ships. Of this number, 435 were Liberty ships. Only 410 Liberty ships remain under contract to be constructed and all of these should be finished early next year. A total of 2279 Liberty ships has been completed since the first one was finished in December, 1941. These vessels have been produced in an average time of 62.7 days each. The performance of our shipyards in building Liberty ships contributed greatly to consummating the greatest industrial and military accomplishment of the ages. Pacific Coast shipyards have completed their Liberty ship contracts, and this type of vessel is now being constructed

only in Atlantic and Gulf Coast shipyards.

Victory Ships

The Victory type cargo ship is now being constructed by six shipyards, five of which are on the Pacific Coast. Building time is being rapidly reduced with each successive vessel. In one yard the time of 60 days for producing a Victory ship from keel laying to delivery was reached on the 28th ship, whereas this record of 60 days with the Libertys in the same shipyard was not reached until the 34th ship. This, in spite of the fact that a Victory ship is almost 20 feet longer, almost 6 feet more beam, is deeper and has more than three times the horsepower, as well as many other refinements, such as electric cargo handling appliances, etc. The Poland Victory, the first ship of this type to complete a trip around the world, has just arrived on the East Coast, and most glowing reports on her performance have been received.

Tankers

Additions to our tanker fleet during the first six months of this year totaled 118 units of 1,215,536 gross tons and 1,929,415 deadweight tons. This rate of production is scheduled to continue throughout the year, so that we will have constructed more tanker capacity than was ever produced before in the world's history in one year. These tank ships added to our tanker fleet, plus the tankers on order yet to be completed, less sinkings, will come close to equaling in capacity the entire world tanker fleet existing before the war. Certainly it is twice as large as any tank fleet existing under one flag today. All of the units constructed this year to date are of large capacity, over 16,-000 tons, having speeds ranging from 16 to 18 knots.

Four Ship a Day

America, the largest shipbuilding nation in the world today, is producing ships at the rate of about 28 per week, exclusive of a vast Navy program. The ships produced today are generally more modern and better suited for post-war needs than those produced a year ago. The Liberty ship, which was built essentially for purpose of war, has served its purpose magnificently, and that program is nearing completion.

American ships cost a great deal more to build than comparable ships from foreign yards. In order that the American shipowner may compete, the difference in cost of the vessel and cost of operation, which takes in wages, etc., to some degree is compensated for by what is often called a subsidy. The fact of the matter is that our standard of living is high and we are determined not to injure it. To preserve that standard of living the Government pays a portion of the differential in costs. American labor receives high wages, and the American seaman during the alst few dangerous years has proved himself certainly worthy of recognition and support.

During the last war almost no modern tonnage was available. Fortunately because of the establishment of the Maritime Commission in 1936 a policy was laid down which was capable of tremendous expansion so that an adequate number of vessels have been available to carry munitions and goods to the fighting fronts. Such a policy should be vigorously supported so that an American shipping industry will thrive over a period of years instead of being spasmodic and an unsatisfactory arm of our national defense. It is essential that the up-to-date facilities that have been established be kept in use, and it is particularly important that the technical skills which have been developed not be allowed to deteriorate.

Post-War Planning

With the approach of peace, the question of the preservation of our merchant marine after the war should be given serious attention not only by shipping men but by all Americans. The vital necessity of a merchant marine in time of war has been proved more than once, and that factor alone should be so potent that the American people will never again consent to have the merchant marine deteriorate as it did after the last war.

Our foreign trade must be increased by supplying the nations of the world with American goods and in return buying from other nations imports which will provide cargoes for return voyages of American ships. It is a depressing fact that the decline in foreign trade among all nations has been steady and severe in the last forty years. In spite of greatly increased production, nations are striving for economic self-sufficiency, so that world trade has since 1913 up to 1938 decreased probably over 30 per cent. The foreign trade of the world should be measurably increased, and American ships should carry their fair share of this increased trade.

The people of the United States should be aware of these facts in order that they may get behind a broad shipping policy which is so vital to the existence of our country as a world power. Not only in coastal districts but in the Midwest the people should realize that a vitalized merchant marine is necessary, and they should support it. Other nations are preparing extensively for post-war shipping activities. We are lagging, and if we do not take positive action we may expect to have a situation similar to that following the last war.

If the ship owners, the shipbuilders, repair men and other people in shipping, which today is one of the great industries, do not get together and urge its support and give the many reasons why the merchant marine of the United States is so essential to defense as well as our national welfare, it will slip back in its old place. We shall have no one to blame but ourselves. Much is being said, there is a great deal of wishful thinking, and some things are being done —but not enough.

On the Ways — SHIPS IN THE MAKING

Left: More than 100,000 persons thronged this yard to visit and watch the launching. The sponsor stood on a special elevated platform so that all could see the christening.

Below: Suzan Teufel, 2½-year-old daughter of Lawrence Teufel, Calship shipwright, takes time out, the pause to refresh. Many, many boys and girls got their first close-up look at Calship.

Family Day at Calship

A combat transport and two Victory freighters were open for inspection to visitors at Calship's first Family Day, on Sunday, August 6.

To all but workers in the big Terminal Island shipyard, the new-type ships have been closely restricted.

Exhibits and demonstrations told the story of Calship's record-smashing ship production. The yard's 373d ocean-going ship, a combat transport, was launched at noon.

A sponsor was selected from Calshippers and guests in the morning, and a Wave, who had accepted a seaman's invitation to be his guest on Family Day, was caught in the whirlwind of chance and became the sponsor of the USS Hocking. The badge numbers of employees formed the basis of the drawing that morn-

ing by which the sponsor and the matron of honor were selected. The winner was Thomas B. Jenkins, a welder of Wilmington. However, with neither his wife nor daughter present at the celebration, it was his privilege to confer the honor, coveted by thousands. Turning toward the crowd, he spotted Pharmacist's Mate 3d Class Frances Sims of Morrison, Tenn., now stationed in San Diego. His mind was made up. So this is the story of the Wave who smashed the bottle, that launched the ship, that 100,000 persons watched slide down the ways.

U. S. Navy S4-SE2 Transports

When Joslyn and Ryan, naval architects and marine engineers of San Francisco, were awarded the Maritime Commission "M" last March, it was officially emphasized that the development of the design and construction plans of these naval type combat transports was an extremely urgent matter.

The usual time allowed to complete the plans and requisition the materials on a job of this type varies from nine to 12 months. However, due to the excellent collaboration between the U. S. Maritime Commission and the Joslyn and Ryan office, and the efficient efforts of that company's design staff, the whole job was accomplished in the remarkably short time of five months, truly a noteworthy achievement, even in wartime.

The work involved, included the developing of design and working plans and the ordering of all materials for two different types of vessels, one a twin-screw combat cargo vessel capable of carrying miscellaneous U. S. Navy wartime cargo, and the other a twin-screw combat transport to carry Navy personnel of all ratings and their complete equipment.

Recently the first of these vessels to be completed by the Consolidated Shipbuilding Corp. of Los Angeles, ran very satisfactory trials, and has since been handed over to the Navy.

Tuna Clipper Launched In Southern California

The tuna clipper Linda Jo was launched for Captain Joseph C. Rogers of San Pedro at the Long Beach yards of Hodgson-Greene-Haldeman, shipbuilders, the latter

part of August, one of the first fishing vessels to roll down Southern California ways since the start of the war. It will replace another clipper requisitioned by the Navy early in the war.

Miss Selma Knopp sponsored the craft, with Miss Enid Kirkpatrick as matron of honor.

Marinship Launches Second U. S. Navy Tanker

The U.S.S. Abatan, the second of six to be built by Marinship Corporation of Sausalito, was launched on August 6.

Mrs. R. W. Adams, the wife of Marinship's popular employee relations' manager, acted as sponsor for the ship.

In tribute to Mr. and Mrs. Adams' son "Jimmy," who has been communications officer on a U.S.N. destroyer in the South Pacific, since the outbreak of war, there was reproduced in colors, high up on the tanker's bow, a fine replica of Jimmy's ship.

The Abatan which is powered by engines of 10,000 hp is under the supervision of the U. S. Maritime Commission.

New Type Navy Craft Launched

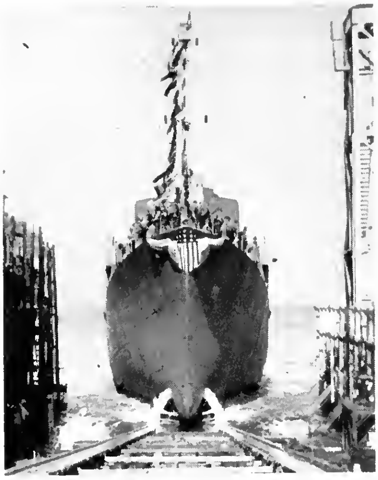
Another fighting ship, the new type destroyer U. S. S. Hugh W. Hadley, named for one of the Navy's heroes killed in action during this war, was launched from the ways of the Bethlehem Steel Co.'s Terminal Island shipyard recently. The U. S. S. Hadley is larger and more deadly than any destroyer yet built in the harbor area.

Mrs. Hugh W. Hadley of Coronado, widow of Comdr. Hadley, killed aboard the Flagship U. S. S. Little during an engagement with the Japanese in the South Pacific, broke a bottle of champagne on the prow of the vessel.

It's a great day for the Adams family. Bob Adams, responsible for staging over 50 Marinship launchings, finds himself on the platform as Mrs. Adams serves as sponsor of the Navy oiler USS Abatan. With them are, at left, Mrs. James Graham, mother of sponsor, and Miss Darcie Adams, maid of honor.

Photo courtesy Marinship

At right, top: A recent side launching of the 100th LST built by employees of Dravo Corporation on Neville Island, Pa. Here she hits the water after her christening. At right is the first LST Uncle Sam ever owned. Shown as she travels down the Ohio River to New Orleans after Dravo produced her. She was launched in September, 1942.



Going down the ways at Bethlehem Steel Company's San Francisco yard is the USS Lofberg, launched on August 12.

July Deliveries Under Par

Efforts of the U. S. Maritime Commission to meet military requirements in the production of vessels needed, has slowed down the merchant ship construction schedule as noticed in the July production record.

Throughout the country the below mentioned yards delivered 126 ships, an aggregate of 1,274,443 deadweight tons. This July record brings the year's production figure to 990 ships of 9,901,984 deadweight tons.

To the military services were delivered 24 special type ships, while only 51 Liberty ships, four under June, were delivered, emphasizing the trend to military types. Other vessels delivered were: 10 standard C-type cargo, 4 concrete cargo, 19 standard tankers, 1 concrete barge, and 4 coastal cargo.

The East led the West by producing 51 vessels to the 34 delivered by the West Coast. Gulf Coast produced 37, and Great Lakes area delivered 4 ships.

The number and types of vessels built by all yards follow:

Shipyard	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co.	3	Tankers
American Shipbuilding Company		
Cleveland, Ohio	3	Military Types
Avondale Marine Ways, Inc., Westwego, La.	1	Coastal Cargo
Barrett & Hilp, San Francisco, Calif.	1	Concrete Barge
Bethlehem-Fairfield Shipyards, Inc.	11	Libertys
Bethlehem-Sparrows Point Shipyard, Inc.	2	Military Types
California Shipbuilding Corp.	7	Victorys
Consolidated Steel Corporation	1	Military Type
Delta Shipbuilding Company, Inc.	6	Libertys
East Coast Shipyard, Inc., Bayonne, N. J.	2	Military Types
Federal Shipbuilding & Dry Dock Co.	2	Military Types
Globe Shipbuilding Company, Superior, Wis.	1	Military Type
Gulf Shipbuilding Company, Mobile, Ala.	1	C-Type Cargo
Ingalls Shipbuilding Co.	1	C-Type Cargo
	1	Military Type
	1	Coastal Cargo
J. A. Jones Construction Co., Inc.	5	Libertys
Brunswick, Ga.		
J. A. Jones Construction Co., Inc.		
Panama City, Florida	4	Libertys
Kaiser Co., Inc.	1	Military Type
Kaiser Company, Inc., Swan Island	6	Tankers
Kaiser Company, Inc., Vancouver	2	Military Types
McCloskey & Co., Tampa, Fla.	4	Concrete Cargo
Marinship Corporation	4	Tankers
Moore Dry Dock Co.	1	C-Type Cargo
North Carolina Shipbuilding Co.	3	C-Type Cargo
	3	Military Types
New England Shipbuilding Corporation	8	Libertys
Oregon Shipbuilding Corporation	4	Victorys
Pendleton Shipyards Company, Inc.		
New Orleans, Louisiana	1	Coastal Cargo
Pennsylvania Shipyards, Inc.	2	C-Type Cargo
Beaumont, Texas	1	Coastal Cargo
Permanente Metals Corporation	3	Libertys
	2	Victorys
St. Johns River Shipbuilding Corporation	5	Libertys
Southeastern Shipbuilding Corporation	3	Libertys
Sun Shipbuilding & Dry Dock Co.	6	Tankers
	2	C-Type Cargo
Todd-Houston Shipbuilding Corporation	6	Libertys
Walsh-Kaiser Co., Inc.	4	Military Types
Western Pipe & Steel Company	2	Military Types

Western Pipe & Steel Launches U. S. S. Grafton

On August 10 the Western Pipe and Steel yard at South San Francisco launched the U. S. S. Grafton, a Navy transport. Mrs. Sidney Belither, wife of the executive vice president of the Shell Oil Company, acted as sponsor and Mr. Belither threw the switch which released the ship.

This vessel was a C-3 type ship built under the supervision of the U. S. Maritime Commission and converted to suit the requirements of the U. S. Navy.

"Hills" Class Tankers By Marinship

The S. S. Kettleman Hills, now outfitting at Marinship, is the first of a series of 32 large tankers which are being built there and christened in the name of important California oilfields. She is the 51st ship to be built in the 28 month history of the Company.

The new "Hills" class tankers are over 525 feet long, of 16,500 deadweight tonnage, and are driven by turbo-electric motors of 8250 hp. These ships, when completed, will be immediately employed on war routes, but they are specially designed to take their place on post-war petroleum trade routes.

The S. S. Elk Hills, the second ship of this class was launched on August 22, just 54 days after the keel was laid, and the S. S. Lost Hills followed down the ways on August 29.

Only a photographer could strike oil in a tanker shipyard and this picture shows the SS Kettleman Hills, just before launching, at the Sausalito shipyard.

COMMUNITY LAUNCHING

Mrs. Hugh Blanchard Vickery, daughter-in-low of Rear Admiral Howard L. Vickery, vice chairman of the Maritime Commission, christened the attack transport USS Hamblen at Ingalls' first "community launching," to which the townspeople of Pascagoula and Moss Point, Miss., were invited. In the launching party are, left to right: Brigadier General W. A. Borden; Rear Admiral H. L. Vickery; R. I. Ingalls, Jr.; Mrs. H. L. Vickery; Miss Barbara Vickery; Lt. Hugh B. Vickery; the sponsor, and Monro B. Lanier, president of Ingalls Shipbuilding Corp.

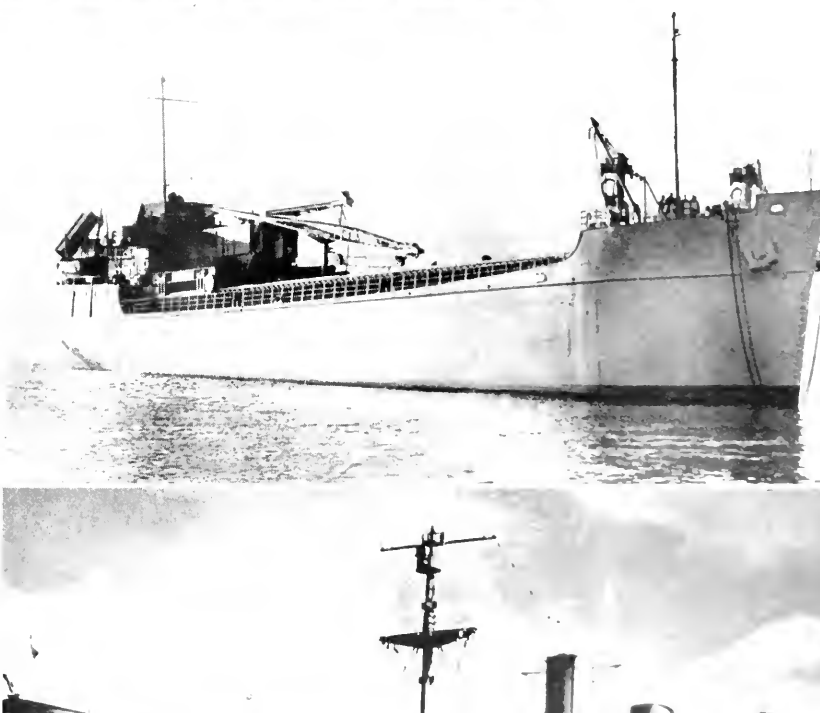
142 Fishing Vessels Returned by W. S. A.

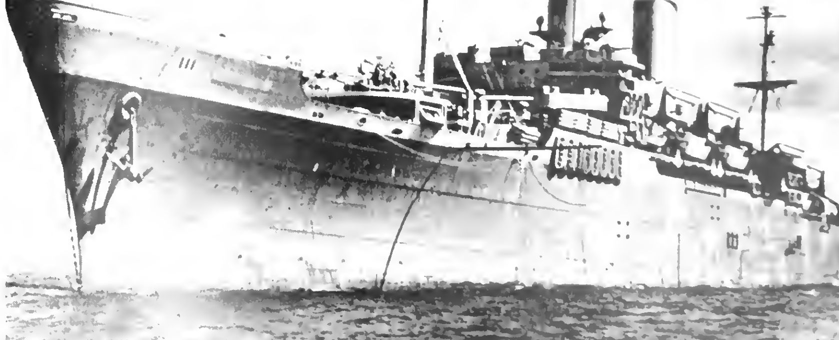
The War Shipping Administration have recently announced that up to August 9, 142 fishing vessels had been released to them by the military forces. These vessels were part of a total of 600 fishing boats which were requisitioned for emergency use by the Navy, Army, and Coast Guard. Most of the released vessels had been operated under bareboat charter, and will now be turned back to their owners and others and the fishing industry.

Below is the list of purse seiners which have been redelivered at San Francisco in June and July, the first since the list announced on July 16, 1944.

Name of Vessel	*Name of Owner*
Santa Rita	Giovanni Compagno
El Capitan	Frank Spadaro
New Rex	Mariano Torrente
City of Monterey	Horace E. Balbo

Specially contsructed vessels are now available for the armed forces making possible the return of vessels formerly used or suitable for use in the fishing industry.





Upper right: Motorship Asa Lothrop, a new type shallow draft vessel equipped with Cooper-Bessemer diesels for propulsion and for operation of unique mobile crane.

Right: Front line Liner, super-troopship built by U. S. Steel's Federal shipyard at Kearny, N. J. An official Navy photograph, first of its kind privileged for publication, after this type vessel has been on the Navy "secret list" for months.

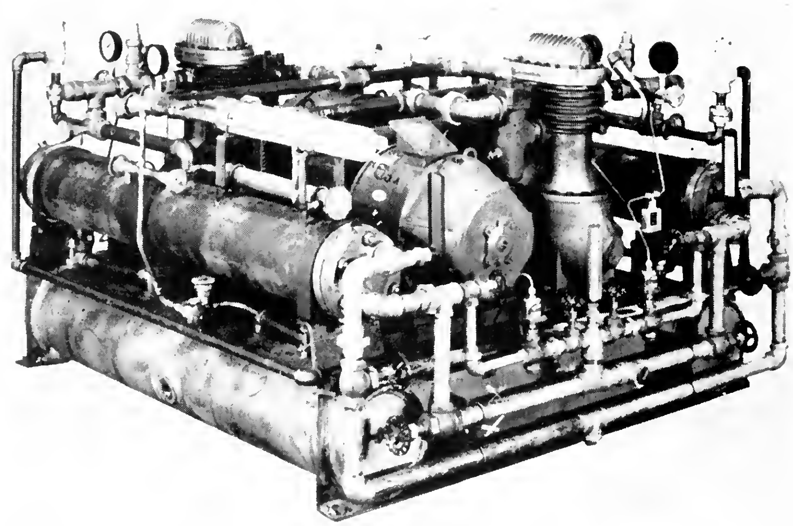
Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK

Refrigeration Unit For Victory Ships

Nearly 1600 square feet of vital cargo area and more than 16,000 man-hours of installation time will be saved on 133 of the nation's new Victory ships by a compact new packaged refrigeration plant, a development of the York Corporation engineering laboratories in collaboration with naval architects.

By conserving weight, space and vital material through the compact design of the new unit, ample refrigerated stores of fresh foods will be made available even on extended voyages. Outstanding feature of the packaged plants is the combination of twin refrigeration compressors, receivers, condensers and all refrigerator auxiliaries, which by means of cross connections can be operated separately on both high- and low-temperature rooms. In emergencies, either compressor can be connected to carry both high and low temperatures simultaneously.



Refrigerant receivers for the plants form an integral structural part of the base, thus increasing the rigidity of framework at the minimum of weight. Built in the form of a rectangle, all piping and valves are located for easy accessibility to all parts. In addition to the application for ship stores refrigeration on the Victory ships, York is now building similar pacakaged units for other type vessels.

With the exception of piping connections to cooling coils and water supply, the new unitary apparatus is ready to use when shipped, saving valuable assembly time. Total weight of the units is 3804 pounds, with dimensions fixed at 70.8 inches long, 67.5 inches wide and 41.5 inches high. The unit mounts two 2-cylinder York Balanseal refrigeration compressors with a combined refrigerating capacity of five tons. Each compressor is driven by a 7½-horsepower motor. High-temperature rooms will be maintained at 40 degrees F. and low-temperature rooms at 15 degrees above zero.

The idea of unitary equipment preassembled at the factory, has also been carried out for the evaporator controls. The thermal expansion valve, solenoid valve, hot gas defrosting valves, thermostat and dial thermometers are all compactly arranged in flush mounted cabinets 24 inches square by six inches deep, with necessary connections to the compressor and cooling coils.

Numerous inquiries concerning the whereabouts of Edward ("Ed") Mooney, one of the best-know chief engineers afloat or ashore, prompts us to report that he returned to sea aboard the SS Sea Star for Matson Navigation on October 17, 1943 where he is, at present, as chief of the propulsion department.

Returning again to sea duty, after ten years ashore as assistant port engineer for Matson at San Francisco rounds out a career of forty-three years of going to sea. He started his career as an oiler in 1901 aboard the old Pacific Mail steamer City of Peking.

Some of the vessels he has sailed in various engine room capacities include the Colon and the China, Acapulco, Rose City, Lurline, the first

Matsonia. He came ashore for Matson in 1928 to be Assistant Port Engineer and continued in this post until 1932. Then he went out on the new Matsonia, the former Malolo and Manukai, later he again came to Pier 32 to return as assistant port engineer. He remained shoreside until last October when he took over the engine room of the Red Star.

Water Hammer Arrester

A new small-size, low-cost solution to the problem of how to eliminate annoying and destructive water hammer has been announced by the Wade Manufacturing Co., Division of Woodruff & Edwards, Inc. Known as the No. 6 Junior, it is the latest addition to the line of Wade Wacor Water Hammer Arresters.

Protection against water hammer is important on board ship, since it ranks next to freezing as the biggest cause of pipe failure. Whenever the flow of liquid in a pipe is suddenly stopped, the force of the onrushing liquid builds up a surge of pressure, then rebounds along the piping, weakening valves, meters, pipe and fixtures.

The new No. 6 Junior consists essentially of a steel casing, containing a flexible metal bellows which serves as a low-compression chamber. The energy created by the sudden cessation of flow in the pipe expends itself in compressing this bellows, so that the pressure which ordinarily causes water hammer is absorbed and dissipated. There are no moving parts—nothing which requires maintenance or adjustment.

Bronze Valves for Marine Use

All-bronze flanged valves, made exclusively for marine use to meet extreme service under wartime conditions, are now being manufactured by the Fisher Brass Foundry, Los Angeles.

Established in 1930, this company is now located in its new building, with floor space totaling more than 11,000 square feet, comprising offices, foundry, machine shop, assembly department, testing department and shipping department.

J. L. Fisher, originally from Indiana but in California since 1906, is founder and senior partner. Associated with him are his two sons, Ralph J. Fisher, chief engineer; and Clifford A. Fisher, in charge of production. Both sons were reared and educated in Southern California.

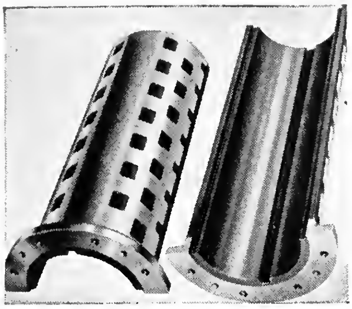
Specializing in the larger sizes of marine valves, from 2½" to 6" inclusive, the company makes gate, globe, angle, swing-check, stop-check, back-pressure relief, hose gate, and angle hose valves of very rugged construction, for many services, including steam lines, water lines and fire mains. Standard threads are used throughout.

Left to right: Ralph J., J. L. and Clifford A. Fisher in a huddle over production of back-pressure valves.

Fisher Brass Foundry's new plant.

Section of machine shop.

Pouring bronze in Small Castings Department.



Bronze-Backed Fabric Bearings

Propeller shaft bearings made of approved resin-bonded fabric materials, precision molded into mortised bronze bushings under heat and tremendous pressure, have been developed by the Gatke Corporation, Chicago, Illinois.

Gatke Duplex bearings, as these improved bearings have been named, combine the performance qualities of genuine molded fabric bearings and the dimensional stability of bronze.

To afford the extra wear resistance of the dense, smooth surface formed by the mold, Duplex bearings are usually molded to accurate dimensions for installation without machining; yet they are easy to machine when necessary, and may be ordered oversize for machining to fit where there are variations in shaft diameter.

They are made to replace propeller shaft bearings of all types on medium size and small vessels. Bearings illustrated are 8½" x 24".

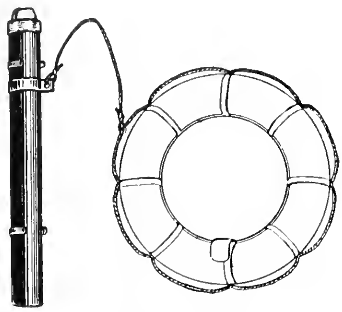
It is claimed these bearings can be carried indefinitely without deterioration for emergency replacement use. They are not harmed by atmospheric conditions, oil, grease or salt water.

Plastic Water Light

Due to the increasing demand for a longer-lived automatic electric floating water light, both as original equipment and as an economical replacement unit, the A.E.F. Water Light Corp. of New York announces the continued production of its Coast-Guard-approved water light for post-war distribution.

The water light's outside tube consists of heavy-bonded phenol resin impregnated into XX-Kraft paper, which is impervious to the action of salt spray, smokestack soot, and extremes of temperature. The outer tube is all-plastic, and it is impossible for water or moisture to seep into the vital electrical components of the light or to impair its buoyancy at any time.

The unique design and practical construction of the transparent plastic battery holder allow easy inspection, removal and replacement of batteries, regardless of their installation-life or condition, and its non-conducting properties inhibit ampere and voltage drainage and minimize the causes of battery expansion and electrolyte leakage.



Plastic water light.

"Life Saver" light.

Life-Saving Lamp

Possibility of being lost in the dark when a ship's personnel is forced to abandon the vessel is prevented by the new Lennan "Life Saver" light, now required for life preservers and life jackets by the Armed Forces. The compact plastic case, with a capacity of a single flashlight battery, is entirely waterproof. The dome-shaped lens is shatter-proof plastic.

The "Life Saver" is lighted by a fractional turn of the lens cap. A cam action spring clip holds the unit firmly in place and, if the material to which the light is attached should tear, the light is also attached to the preserver or jacket by means of a large safety pin and a three-foot woven lanyard.

While shipments are limited at this time to "war orders," this safety device has many uses in the transportation, industrial and construction fields as a warning signal. The light, like the waterproof, damage-proof Rub-R-Lite, is manufactured by William M. Lennan, Inc., Los Angeles, Calif.

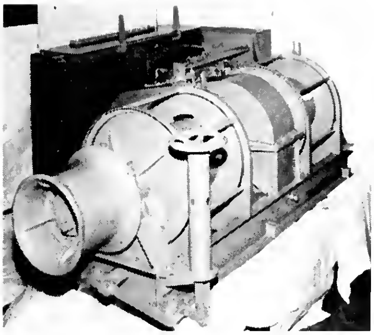
A New Plug Valve

The Hamer Oil Tool Company of Long Beach, California, is announcing a new valve which embodies a simple, easy and safe method of replacing the gland packing while the valve is in the line under pressure and at the same time retaining full control of the plug.

As shown in the illustration, the bottom of the bonnet and the top shoulder of the plug are finished to the same taper. When the plug is lifted by the adjusting nut to a snug fit between these two tapered surfaces, a water-tight metal-to-metal joint is effected. The gland is then raised to permit the old packing to be removed and new packing inserted. The gland is then tightened on the new packing and the plug lowered and reseated in the valve body by turning back the adjusting nut.

The adjusting nut is used also to raise the plug to a free turning position and to reseat the plug again. These valves can be furnished to operate at any temperature and to fit any requirements as to materials of construction; they come in wide ranges of sizes and working pressures.

Cross section showing the tapered shoulder on the plug which seals against the shoulder in the bonnet when the plug is raised. This seal permits replacement of the gland packing under pressure.



New Design Uniwinch by Lake Shore

A new double-drum, double-clutched Uniwinch, type O-U, is announced by the Marine Division of Lake Shore Engineering Co., Iron Mountain, Michigan. The drums are arranged in line on one shaft with the driving gear between the drums, another departure from conventional designs made by Lake Shore, particularly for faster unloading of combat-loaded vessels.

Type O-U, in addition to the double-drum, double-clutched, single-speed model shown in the illustration, is also made in two other models: single-drum, single-speed, single-clutched, and with extension shafts; double-drum, double-clutched, and with extension shafts. All the features of the Uniwinch design are retained with lighter weight welded steel frame.

New Electrode Holder

Just announced by the Allison Tool & Engineering Company of Los Angeles is a new electrode holder for welding. Made in two identical models, Model "A" is a 19-ounce unit built to handle heavy 300-500 ampere work; and Model "B," a 6¼-ounce holder for lighter 200-ampere jobs.

The new electrode holder is molded of a high heat-resistant plastic to insure full insulation and to eliminate completely all possibility of arcing due to slag, moisture, or contact with grounded surfaces.

It is a simple, sturdy holder, with only three main parts—the handle, cable connector and tip. Designed for either mechanical or solder cable connections, it features quick change and permits burning of electrodes to within ½ inch of the holder tip.

According to the manufacturer, this holder has been thoroughly tested for practicability through actual performance and electrical meter tests.

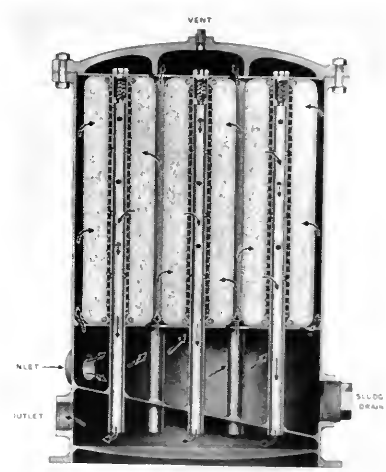
New electrode holder.

Cleaning Turbine Reduction Gears

A new method of flushing dirt from marine reduction gears is announced by the Winslow Engineering Company of Oakland, California. Prior practice among the builders of reduction gears and at shipyards has been to flush out dirt, welding scale, metal chips and other foreign matter by circulating special flushing oils in the lubrication oil system, which frequently required a number of days of continuous circulation, since the strainers or centrifuges remove only the larger particles. With the Winslow Giant-Flo system, a battery of large-capacity filters are inserted directly in the main lubricating oil line and the entire flow of lube oil circulated through the special Winslow filters.

A typical installation to flush out turbine reduction gears at one of the Navy yards consists of six filters connected together in parallel by integral inlet and outlet manifolds. The cases that contain the filter elements are steam jacketed to raise the oil temperature to approximately 140 degrees F.

In each of these Giant-Flo units there are 57 individual filtering elements, which give a total area of more than 4700 square inches. When pressure gages indicate a back pressure of approximately 15 pounds the elements are replaced. The Model J-57-930-A Winslow flushing unit handles 75 gallons per minute of SAE 30 oil at 140° F.



Winslow filter.

Battery of filters for cleaning the flushing oil for reduction gears.

Mail Line Gets Rebuilt Vessel

Described as one of the strangest ship assignments in the history of Pacific Coast commerce, the War Shipping Administration has announced that the American Mail Line has been assigned operation of the Liberty ship Valeri Chkalov which broke in two last November off the Aleutians while bound for Seattle from Siberia.

The vessel was formerly assigned to Russia under lend-lease. The ship parted at sea, but the watertight bulkheads held, and both fore and aft portions of the ship remained afloat. Russian ships in the vicinity rescued all officers and crew members.

Recently the after portion of the Valeri Chkalov was towed to Vancouver, B. C., and delivered to the Northvan Shipbuilding and Repair Company. The bow portion, which had been taken to an Alaskan port, is now scheduled for the same destination, where the two sections will be drydocked and welded together.

Reports first stated that the repair company was reluctant to accept the stern portion of the ship, but this difficulty was cleared up when it was announced that the American Mail Line had been appointed general agent for the vessel, with her bow in Kodiak and her stern in Vancouver.

Calship Changes To a Two-Shift Day

To meet a Maritime Commission demand for increased production of transports, the California Shipbuilding Corporation changed from a three-shift to a two-shift day effective August 21.

The yard's graveyard shift has been absorbed by the day and swing shifts, each of which work nine actual hours, the additional time worked to be paid at the overtime wage scale in accordance with the master agreement covering new ship construction between the Pacific Coast Shipbuilders and the Metal Trades Department of the American Federation of Labor.

PLANNING AND PRODUCTION METHODS

(Continued from page 77)

engine room and through the bulkheads into the auxiliary and after machinery spaces. The actual location of these cuts was determined from the mock-up in order to make the openings in the most convenient places. Other openings were cut into the steering gear room, laundry, galley, switchboard rooms, and I. C. room. These access openings perform another very valuable function during construction—that of normal traffic access from one compartment to another—and for this reason the work of completing the compartments affected was planned in such a way as to leave the closing of those openings to as late a time as possible.

In general the construction, completion, testing and trials of the vessel were handled by the same organization and procedure which had been proved on the C-1 cargo vessels. The U.S.M.C. inspection office, under the supervision of W. R. Boyd, Principal Hull Inspector, and T. W. Mearns, Principal Machinery Inspector, was in full charge of the acceptance of all work except certain items such as radio, radar, and ordnance installations, which were supervised by U.S. N. personnel from the Assistant Industrial Manager's Office. As a means to aid in coordination of Navy supervision and supply of equipment, a Liaison office of the U. S. N. was established in the yard, and proved of considerable assistance.

In recognition of the fact that the APA 57 was delivered from Consolidated Steel's Wilmington Yard as the first Navy Attack Transport of the current program to be commissioned into service, the yard was awarded the Maritime Gold Eagle Pennant with Wreath, the highest Government production award in the country, which had previously been awarded only to yards engaged in the Liberty ship program.

COASTAL MOTORSHIP C1-M-AV1

(Continued from page 69)

circulating and makeup circualting pumps.

Heat Transfer Products — Fresh water coolers.

Zinsmeyer Manufacturing Co.— Main, emergency and I.C. switchboards; power and lighting panels.

American Bosch Corp.—Six fuel injection pumps for main engine.

Maxim Air Silencer Co.—Intake air silencer, size 48-24.

Bendix Aviation Co. — Fuel oil pumps for generator engines.

Pittsburgh Steel Foundry Corp.— Two anchors.

Bethlehem Steel Co. — Propeller, and stream line, towline cables and reels.

Sperry Gyroscope Company—The master gyro compass.

Durkee Marine Products Co.— Complete engine order telegraph system.

Submarine Signal Co.—Fathometer record, transfer and amplifier system.

Radiomarine Corp.—Radio receiving and transmitting equipment.

Mallott & Peterson—Floor covering.

Martin Parry Co.—Furniture and joiner work.

Kaiser Cargo Inc.—Installation of all plumbing and ventilation system.

The sea trials, all according to the U. S. Maritime Commission and the U. S. Navy requirements, were completed successfully, and are as shown below:

Anchor and windlass test; emergency steering test; normal power run; gyro pilot steering test; turning circle test; "Z" maneuver 10% overload run; ahead steering tests; 25% overload test; emergency astern test; astern run; astern steering test; emergency ahead test.

The ship was built to the American Bureau of Shipping rules. George G. Sharp, naval architect of New York, was the design agent.

Running LIGHTS

Who When Where?

Edited by B. H. Boynton

Sea gull's view of San Francisco Harbor. This is the cover design used on the booklet put out by the Junior Chamber of Commerce publicizing the Port.
Cover design by Giacomo Patri

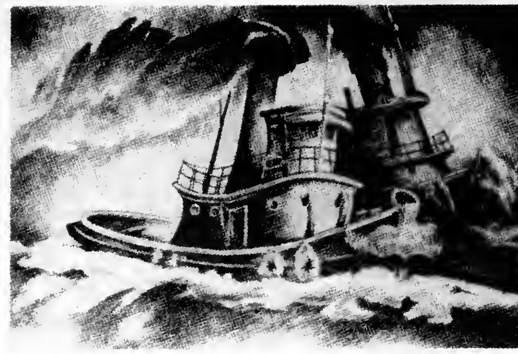
Little did Mayor James Rolph dream, when he proclaimed San Francisco's first Harbor Day, August 11, 1921, for the purpose of promoting unity among public agencies, shipping, export and domestic trade interests, and the future welfare of San Francisco, that in 1944 San Francisco would be America's No. 1 Port of Embarkation in the world's greatest war for freedom, and that through the Golden Gate would flow the wherewithal for victory in the Pacific.

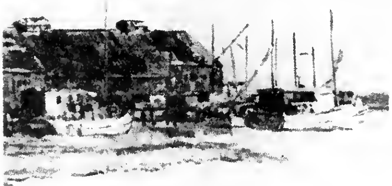
For years now the celebration of Harbor Day has been the pride of the Junior Chamber of Commerce. This year they made it important enough to win national recognition with aquatic sports, marine displays in the Ferry Building and Marine Exchange, a reception, a ball with a nation-wide radio program, a cargo handling demonstration by the Army and public visits to an Army transport at its pier. But more—they told the people of the Bay area the importance of shipping in their daily lives. To perpetuate this day, the Junior Chamber published a 36-page booklet "San Francisco—Harbor for Ships and Men," which was prepared by the staff of Pacific Marine Review.

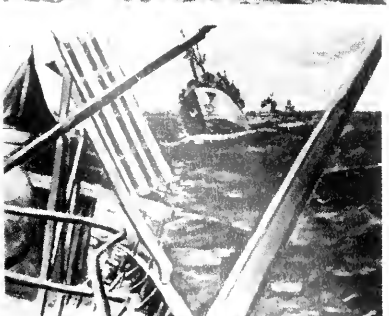
A run of 50,000 copies was soon exhausted and the demand for more copies continues weeks after the affair. The importance and the work of the harbor is the theme, and it is suggested that other ports might follow San Francisco's example. A large part of the future of the Nation depends on its shipping—and the story is worth telling to the public.

SECOND ANNUAL ART Exhibition

by Merchant Seamen of the United Nations







Thirty-six seamen, of 13 nationalities, serving in various capacities in our Merchant Marine, were represented by the 79 oils and water colors exhibited recently in the Merchant Seamen's Wartime Art, held at the San Francisco Museum of Art and sponsored by The Women's Organization for the American Merchant Marine, Port of San Francisco.

The seaman-artist, whose painting polled the most votes for its popular appeal, was given a war bond. The voting was conducted by the Women's group as a friendly gesture to stimulate interest in the show, as well as encourage the seafaring artists.

Members of the Women's organ ization served as hostesses at th Museum throughout the exhibition Mrs. James S. Hines, chairman, ha as her assistants at the gallery Me dames Carl W. Flesher, B. N. D Rochie, Frank Short, Frazier Bailey Harry W. Parsons, Paul Cronk, Ea H. Carder, J. A. McKeown, Hami ton B. Moore, David Currier, Davi Neilson, E. N. Babb, Allen Tool Alfred Pittman, Clyde Williamson Clay Bedford, Sam Hawkins, Mi Marian Doherty and Mr. Carl Fri chey, veteran marine cook, and or of the exhibiting artists.

Reproduced here are selections from the exhibition, which includes a beach scene at New Orleans, a Harbour Light at Kingston (Jamaica), Convoy rolling home, and a Tugboat race.

Upper right: Hostess of the day, Mrs. B. N. De Rochie, presiding at the Gallery, served with other members during the exhibition.

At right: A preview of the exhibit was held at the Army-Navy Club the second Tuesday in August. Pictured are: Mesdames J. A. McKeown, Carl W. Flesher, Harry Parsons, James S. Hines, Mr. Fritchie whose work is shown, Allan Toole, Earle H. Carder, David Neilson, Clyde Williamson and D. J. Lillevand.

U. S. Maritime Commission Inspectors of Consolidated Steel Corporation

Wilmington, California

Top left: Clerical force, reading left to right, front row: Theresa M. Slone, Natalie M. Boyd, Connie D. Geerlings. Top row: Neva C. Schulz and Gloria E. Hughes, supervisor.

Top right, front row: George K. Davis, Jr., senior hull inspector; Jesse S. Hansen, first senior hull inspector; Thomas W. Mearns, principal machinery inspector; William R. Boyd, principal hull inspector; Roland N. Harper, first senior electrical inspector. Middle row: John G. O'Connor, senior machinery inspector; Alfred Donald, senior machinery inspector; John R. W. Smith, senior hull inspector; Kenneth J. Grotemat, senior machinery inspector. Top row: Carl M. Lang, senior machinery inspector; James V. Bell, senior electrical inspector; George H. Van Ackere, senior electrical inspector.

ELECTRICAL INSPECTORS

Front row, left to right: F. W. Dalton, J. V. Bell, T. W. Mearns, R. N. Harper, G. H. Van Ackere, and C. J. Buckley. Middle row: H. R. Pelton, N. A. Pulsifer, L. J. Martin, H. H. Lipney, E. G. Steelman, Raul Soza, Max Blumenstein, R. D. Caley. Top row: W. I. Schwartz, D. H. Stair, W. V. Anderson, J. E. Van Arnam, H. A. Llewellyn, I. T. Erichsen, Lucian Sobieski, Anton Gayhart, and F. J. ale.

HULL INSPECTORS

Front row, left to right: John Houston, J. R. W. Smith, J. . Hansen, W. R. Boyd, G. K. Davis, Jr., and J. C. McNulty. Middle row: R. L. Scanlan, Richard Pearce, J. P. Martin, N. L. Cummings, W. H. Saling, L. F. Major, J. P. Wright, and James Barnet. Top row: R. J. Ervin, F. C. Hartz, Theodore Richie, Charles Gibbs, Joseph Azar, S. C. Frazier, C. C. Crum and W. F. Ross.

MACHINERY INSPECTORS

Front row, left to right: C. M. Lang, Alfred Donald, T. W. Mearns, J. G. O'Connor, K. J. Grotemat, and G. H. Saunders. Middle row: Owen Corr, C. W. Wilcox, W. E. Smith, . C. Kinsman, J. C. Bickel, R. E. Hewett, Charley Long, and David Low. Top row: F. W. Smith, W. H. Connick, George Andersch, G. A. Spelts, R. N. Southard, G. M. yfvinkel, L. Q. Peterman and M. J. Malone.

Andrew Schmitz (left), safety engineer for the Seattle Waterfront Employers' Association, addressing the Seattle Propellers. At right is David M. Maynard, former U. S. Embassy representative in Peru.

CARGO PICTURES
REELED FOR SEATTLE PROPELLERS

By Roy Ryerson

A unique program of motion pictures illustrating cargo handling gear and safe methods of cargo handling received highly favorable comment at the August meeting of the Seattle Propeller Club last month.

The showing of the motion pictures was arranged by Andrew Schmitz, safety engineer for the Seattle Waterfront Employers' Association, with Colonel C. H. Bunty who represented the training division of the U. S. Army Transportation Corps, Seattle Port of Embarkation.

To men who are engaged every day in the handling of vital war cargo, the pictures were still an eye opener, covering the intricate procedures in an "A, B, C" fashion, teaching from the ground up and following procedures showing the utmost in efficiency and safety in handling. The films are a part of the series used to train Transportation Corps stevedores.

Following these interesting motion pictures, Mr. Schmitz gave a brief address on safety in handling cargo. He pointed out that of 1175 accidents he has personally investigated that less than one per cent were due to gear failure and more than 90 per cent due to man failure. Of the 90 per cent classification, Mr. Schmitz maintained that 10 per cent were the direct fault of the employer because of having given improper handling instructions.

The meeting also featured a short talk by David M. Maynard, former U. S. Embassy representative in Peru, who outlined possibilities of greatly increased trade with South America, illustrating his remarks with the claim that an American manufacturer may advertise goods for sale to South American retailers and receive a telephone order where the prospective buyer will flatly state: "I'll take twenty tons. Say, by the way, what is it I am buying?"

PORT ENGINEERS

This group of San Francisco maritime men posed for PMR's camera at recent luncheon get-together at the Palace Hotel. Pictured are: J. F. "Jack" Govan, president of Xzit Sales Company, host of the affair; Captain Thomas White, port captain, and H. J. Wrigley, port engineer, Weyerhaeuser Steamship Co.; E. L. Harris, port engineer, and Fred H. Brewster, assistant port engineer, Alco Steamship Company, Inc.; Allan L. Bissall, George Nelson, W. H. "Bill" Rudy, and a stalwart trio from the PMR staff.

WASP-WAISTS FOR BILGERS!

With the physical shape of its members in mind, The Bilge Club of Los Angeles Harbor has enlisted the broad experience of William "Bill" Rudy to take over outdoor recreational plans. Old time sports followers may recall that "Bill" Rudy was once a crack golfer as well as horse shoe pitcher and during the rush of war work naturally laid his clubs aside. Dominoes is purely mental exercise as Mr. Rudy sees it . . . what the boys need is outdoor workouts—so they can all disport trim waitslines. Bilgers who are in bad shape and need help may consult Mr. Rudy over the phone—Call TWinoaks 1171.

AMAZING!!

This camera study of an intense young American was caught at the launching of the tanker SS Mission San Luis Obispo at the Marinship yard, Sausalito. Boy Scouts of Troop Seven, Fairfax, California, came to the launching to take part in the ceremonies, and this moppet, somebody's kid brother, tagged along. Un-uniformed, unknown, and unnoticed, he managed to crawl through the forest of legs to catch an awe inspiring sight of the huge tanker hitting the waters of Richardson Bay.

Photo courtesy of Marinship.

Shoreside Watch!!

Personalia

When **John Mahoney** resigned to go to Australia for the War Shipping Administration, his place as general manager of Pacific Tankers Inc. was taken by **Andrew Nielson,** who was promoted from general superintendent.

Captain H. J. Tiedemann, well-known in West Coast marine circles, is the Pacific district operations officer of the U. S. Maritime Service. He is in charge of 29 Maritime Service units on the Pacific Coast from Los Angeles to Seattle. His headquarters is 1000 Geary Street, San Francisco.

Carl W. Flesher, regional director of Construction on the West Coast for the U. S. Maritime Commission, announced the appointment of **Louis T. McCarthy** as Materials Assistant to the Director. In this capacity he will be responsible for the administration and coordination of the activities of the Material Control Section of the Contract Termination Section.

James A. Hull was appointed Acting Chief, Material Control Section; **Harry Ahlborn** was appointed Acting Chief, Contract Termination Section.

Lieutenant Commander Donald Watson, USNR, has been appointed assistant to **A. R. Lintner,** director of the North Pacific Division of the War Shipping Administration with headquarters in Seattle. Comdr. Watson, who has been with the foreign economic administration at Washington, D.C., arrived in Seattle the first week of August via San Francisco, where he was formerly in charge of the Interocean Steamship Corporation offices. He was released by the Navy on loan to the foreign economic administration but was called back to aid in the expediting of tremendous increase in the lend-lease cargoes from Northwest ports.

Tube Turns, Louisville, Kentucky, announce the re-opening of its Los Angeles office in the Van Nuys Building, with **James H. Withers** in charge. For the last nine years, Mr. Withers has been associated with valves, fitting, and industrial supply firms in the West Coast area.

W. D. Fernhout, chief plant engineer for the U. S. Maritime Commission in Oakland regional offices since the start of the war, resigned effective August 1.

D. D. Dick, his assistant, was promoted to fill Mr. Fernhout's post by Director Carl W. Flesher.

William "Bill" Bowers, one of the best known chief engineers sailing out of the Port of San Francisco, is now night superintendent engineer for the General Engineering & Drydock Co.

The last seagoing berth for Mr. Bowers was as chief of the Grace liner Santa Elena. This vessel was sunk in the Mediterranean.

The appointment of **A. J. Hanlon,** of New York, as Production Manager of the Harvill Corporation, was announced recently by C. K. Pistell, president of the Corporation.

Mr. Hanlon recently retired as manager of the Production Department of The International Nickel Company. He has had over 25 years experience in the production of metals and meat products.

Changes Ownership

The following officers to direct activities of the Alaska Steamship Company, September 1, following purchase of the concern by Skinner & Eddy Corporation of Seattle from the Kennecott Copper Corp., New York: President, W. G. Skinner; Vice president, Lawrence Bogle, Seattle attorney; Treasurer, Raymond C. Anderson; Secretary, C. M. Mitchell.

RECEIVES THREE GOLD STARS

Proudly displayed is the recent "M" award to George G. Sharp, naval architect of New York, by Rear Admiral Vickery. 900 employees were presented with merit badges during the ceremony. Nicholas Caserino and Ralstan Miller accepted the pennant and badges for the employees.

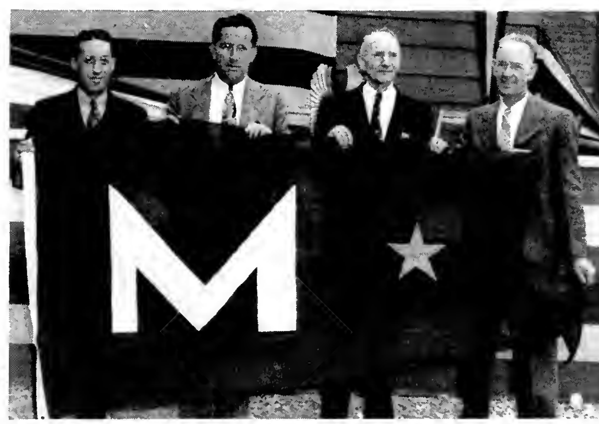
Awards

Instrument Laboratory's "M" Award

Outstanding production achievement in the manufacture of vital salinity indicating equipment last month won The Instrument Laboratory, Inc., of Seattle the Maritime Commission "M" pennant.

During the program, Louis R. Kettenring, president of the firm which he founded, accepted the award from Holman O. Lenhart, representing the Maritime Commission, who stated that this company has turned out 1400 of its products since the war started, or enough to equip half of the ships built in that time.

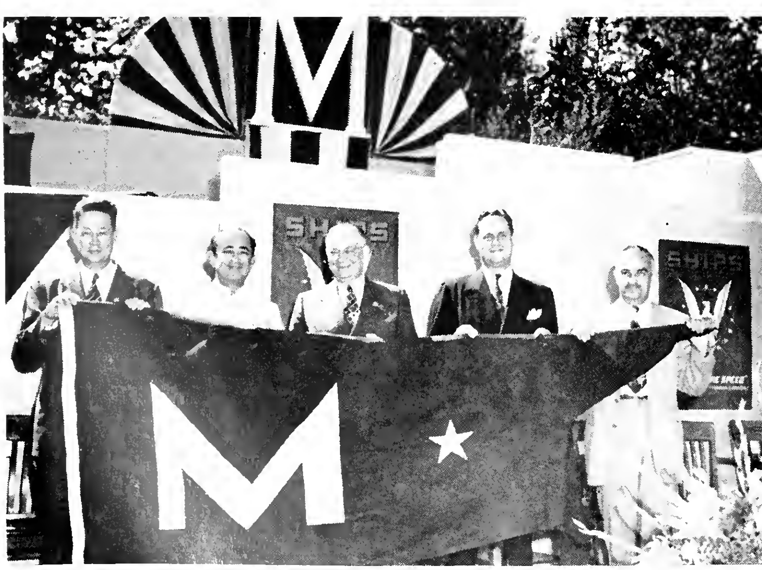
The Seattle firm, which recently announced the opening of a Los Angeles plant at 1836 W. Florence Street, represents Cummings Machine Works, Wheelco Instrument Co., Pitometer Log Corporation, Moeller Instrument Co., Certified Gauge Co. and the Pneumercator Co. They manufacture salinity indicators, electric tachometers, mechanical telegraphs and electric telegraphs.



The Instrument Laboratory, Inc., of Seattle recently won the Maritime "M" pennant. Holman O. Lenhart, Public Relations Division (left), U. S. Maritime Commission, Oakland, California; Henry M. Jackson, Congressman, Second Congressional District, State of Washington, representing the Merchant Marine and Fisheries Committee; Louis R. Kettenring, president, The Instrument Laboratory, Inc.; and Edward Tucker, chief inspector, USMC, Seattle.

Kerotest Receives Fifth "M" Award

Kerotest Manufacturing Company of Pittsburgh, Pa. has been awarded by the U. S. Maritime Commission a fourth gold star to add to its Maritime "M" pennant, symbolizing the renewal of the award for the next six months period. This new honor makes the fifth award from the Commission for the company's production of equipment for the Victory Fleet Program.



Wade Newbegin (left), president R. M. Wade & Co., Multnomah Iron Works, and Ernest Crichton (extreme right), treasurer, proudly display "M" flag awarded their company by the U. S. Maritime Commission and presented by C. W. Eliason (second from right), Pacific Coast industrial relations adviser, U.S.M.C. Others shown are: Michael Miller, manager, Kaiser Company, Inc, Vancouver, Wn., and Hon. Earl Riley, Mayor City of Portland.

Maxim Silencer Award

A second star for their Army "E" Production Award Burgee was recently received by the Maxim Silencer Company in Hartford, Connecticut. The award was made by Lt. Commander R. W. Rose, USNR.

The original award was made in the middle of 1943 and the first star added six months later. Maxim silencers are in wide use today on diesel powered craft in the Navy, Coast Guard and Merchant Marine.

Naval Architect to Coast Marine Engineering

Mario Palmieri, naval architect of 23 years of varied engineering experience, has recently joined the staff of Coast Marine Engineering Co. of Long Beach, California. After his graduation from the University of Naples, Italy, in June 1921, following a course at the Naval Academy and a three-year service as naval officer in World War I, he came to Southern California where he first worked at the Los Angeles Shipbuilding and Drydock Corporation.

Since then he has contributed constantly to the progress of California with his work in all fields of engineering.

In the field of naval architecture he is to be remembered for his teaching of naval architecture at the University of So. California, in 1940-1941. Due to his interest in concrete shipbuilding he has done a considerable amount of work for the U. S. Maritime Commission.

R. E. Hall Visits Pacific Coast

Making a first-hand inspection of the Pacific Coast shipbuilding activities, Dr. R. E. Hall, director of Hall Laboratories, Inc., of Pittsburgh, Pa., was a recent visitor to the principal Pacific Coast ports. While in the Los Angeles Harbor district, he spent considerable time in the busy shipyards with Ray Sullivan, Southern California manager for Hall Laboratories and the Hagan Corporation.

In the San Francisco Bay ditsrict, the Hagan and Hall Northern California manager, Clyde Williamson, accompanied Dr. Hall on a tour of yards and marine operating offices.

Left to right: W. T. Crowe, general manager, Detroit Diesel Engine Division, General Motors Corporation; Frank E. Bodine, Westinghouse manager at San Francisco office; and Jack Hardie, general superintendent of Ship Construction at Marinship.

Propellers! Are You Going To New York?

How many of our Pacific Coast Propellers are planning to attend the 18th Annual Meeting of the Propeller Club and the American Merchant Marine Conference at the Waldorf - Astoria hotel in New York? If you are going East and plan to devote three days, October 18, 19, and 20, to the Conference it is advisable to register with your Port secretary-treasurer, as each Port is limited to 13 delegates.

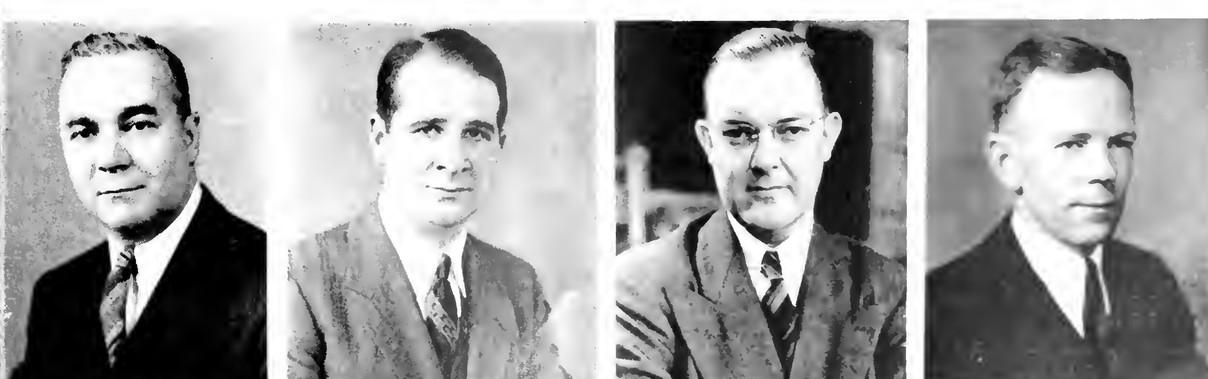
Inspects Eastern Yards

Jack Hardie, general superintendent of Ship Construction at Marinship Corporation, recently left for a tour of the principal shipyards of the country now engaged in building the tanker type of ships. The trip is for the purpose of stepping up production by acquiring the procedure and costs of other yards. Mr. Hardie has been building ships over 48 years, coming out of retirement in 1941 to work at the California Shipbuilding Corporation at Wilmington. Marinship "drafted" him in 1942.

Caterpillar's Recent Appointments

Various appointments were made at Caterpillar Tractor Co. of Peoria, Illinois, following the Board of Director's meeting recently, according to announcement by President L. B. Neumiller.

William Blackie and William J. McBrian have been made vice presidents, William H. Franklin made Controller, succeeding Mr. Blackie in that position, and Edward W. Jackson is now general parts manager of the firm.



Left to right: William J. McBrian, William Blackie, William H. Franklin, Edward W. Jackson, all recently appointed to executive posts at Caterpillar Tractor Co.

Top: Charles Cunningham, yard superintendent of Kaiser Company's Richmond Shipyard No. 4. Below: Ernest Church of Nordberg, and Alden Weidenhagen, who succeeds Mr. Church at Richmond yard No. 4.

Nordberg's Installation Engineers

Ernest L. Church, Nordberg's engineer in the San Francisco office in charge of service and installation in all the Bay area yards, has been transferred to the Los Angeles office to take charge of similar work in that Area. Before coming here he looked after the company's work in Tampa, Florida. Milwaukee, Wisconsin is his home port.

Alden Weidenhafer, who was his able assistant in the Kaiser No. 4 yard at Richmond, California, has now taken charge of the Nordberg work there.

Cunningham of Richmond No. 4

Charles Cunningham, now in charge of Kaiser Yard No. 4 since July 11, has had some tough assignments since the outbreak of the war.

On December 9, 1941 he left New York in an Army plane and fifty-four hours later arrived in Asmara. He then proceeded to Massaua on the Red Sea where he supervised the salvage operations of twenty-seven scuttled German and Italian ships, and two drydocks, one 630 feet long. Cairo, Egypt was his next port of call, where he helped evacuate the American population while Rommel's Afrika Corps was just 30 miles West. Palestine, and more ship salvage work at Tunis, were two side trips on his journey to the British Isles, where he saw the effects of the air blitz on the English and Scottish industrial centers.

"Charlie" is very modest and likeable. We wish him every success in his present assignment.

Pioneer Ship Chandler's New Location

The Schou-Gallis Company, Ltd., pioneer ship chandlers, formerly located at 34 Davis Street, has recently moved into an attractive new home at 250 Sacramento Street, San Francisco.

The firm was organized about 20 years ago by Captain Gronner Gallis and Rolf C. Schou, both veterans in the Pacific Coast shipping industry.

This Company is distributors of Plymouth Cordage, Bethlehem Wire Rope, Vaco Life Suits and Veritas Lubricating Oils. They also carry a full line of Marine Electric supplies for foreign ships, which proves very helpful at this time when hundreds of these ships are engaged in Allied war service and are unable to get these necessary supplies from their home ports. They also handle a complete line of lifesaving equipment, in addition to the Vaco Life suit.

GEARED FOR ACTION

A conference in progress in Los Angeles offices of Howard F. Parkerton, Western representative of Farrel-Birmingham. Port to starb'd we have: Carl Hitchcock, vice president and sales manager of F-B from Ansonia, New York; H. F. Parkerton, Jr., his dad's assistant; W. A. Gordon, engineer for F-B; and Howard Parkerton.

David Winslow With George S. Lacy

George S. Lacy, manufacturers' representative of San Francisco, announced recently the association of David Winslow with his firm. Mr. Winslow was formerly with Wilcox, Crittenden & Co. in Middletown, Connecticut, and he brings with him his marine connections not only with that firm but also in that state.

In addition to Wilcox, Crittenden & Co., they represent L. W. Ferdinand & Co., manufacturers of Jeffrey's marine glue, of Boston; H. S. Getty & Co. of Philadelphia and the Boston & Lockport Block Co. of Boston.

"Bert" Haney Promoted

Popular "Bert" Haney is being congratulated by his many friends on his recent appointment as Assistant Vice President of Tide Water Associated Oil Company. A veteran of more than 25 years' service with the company, H. B. Haney has under his supervision the Marine Department, Traffic, Transportation, Automotive, Telephone and Telegraph Departments.

Northwesterner To Engineering Post

C. Garth Dickens, 1943 engineering graduate of the University of Washington and a native of Tacoma, has joined the Seattle staff of the Westinghouse Electric & Manufacturing Co. as an application engineering assistant. Announcement of the appointment was made by K. L. Howe, Seattle manager for the company.

Mr. Dickens joined Westinghouse as a graduate student at East Pittsburgh, Pa., soon after receiving his engineering degree at the University of Washington. Prior to studying at Washington, he received a business administration degree at the College of Puget Sound, Tacoma, graduating there in 1940.

He holds membership in the American Society of Mechanical Engineers, Delta Pi Omicron fraternity, and the Pacific Coast Magicians' Association.

Notice of Death

Merritt-Chapman & Scott Corporation of New York announce with profound regret the death of their President, Earl A. Banister, on August 22, 1944.

T. S. Bailey Passes

The death of Theodorous S. Bailey on August 4, who at that time was supervisor of the Planning Division of Joslyn & Ryan, Marine Engineers and Naval Architects of San Francisco, brings to a close the successful and colorful career of a well-known and well-loved mechanical engineer and naval architect.

He was born in Plattsburgh, N. Y. in 1873. He was graduated from Purdue University with a B. M. E. degree and later received a M. E. degree from Cornell University in Naval Architecture.

From graduation until 1903 he served as a draftsman in Government service. In 1903 he was employed by the Electric Boat Company, Elizabeth, N. J., and remained with them until June 1924 as supervisor of Construction. He then devoted twelve years to personal projects involving mechanical research.

T. S. Bailey

From chief engineer of the Becker Pump Company of Emeryville, California he went to the Shell Oil Company at Martinez, California. He was engineer with Shell until September 1939 when he took a position as construction engineer with Transamerica Construction Company at Avon. From there he went to C. C. Moore of San Francisco as a design mechanical engineer and in June 1942 became supervisor of the planning division of Joslyn and Ryan.

W. S. Gibbs
Vice President of Turl Iron & Car Corp.

Opening Office in Oakland

The Turl Iron & Car Company have announced the opening of a West Coast office, where a stock of spare parts for the manufacturers' line of equipment will be maintained. Located at 560-14th Street in Oakland, the new office is operating under the management of Wm. S. Gibbs, who is well known in the Bay area marine and industrial circles.

The Company and its predecessors will celebrate their 100th Anniversary next year. During that period they have been one of the leading manufacturers of heat exchangers and equipment for the chemical and sugar industries. However, when the war broke out the organization turned over its facilities to the Maritime Commission for the construction of auxiliary condensers, evaporators, fuel oil heaters, feed water heaters and grease extractors for Liberty ships. In addition the manufacturers also supply similar equipment for Victory ships, Tankers and other vessels.

Ship Models and Sea Scout Exhibit

The Women's Organization for the American Merchant Marine sponsored an exhibit of one hundred models of ships from Spanish galleons and clipper ships to modern freighters and landing craft, which was displayed on the Exchange Floor of the Marine Exchange, San Francisco.

Naval Architects to Meet

The Northern California unit of the Society of Naval Architects and Marine Engineers will hold their next regular meeting in the Engineers Club, 206 Sansome Street, San Francisco, the evening of September 29, 6:30 p.m. Guest speaker will be L. S. Jacobsen, Lt. Comdr., USNR, of the Mare Island Navy Yard, who will present a paper on "Ship Vibration Problems — Some Causes and Effects." He is well versed on this subject and should make a interesting talk.

Jennings Back with Socony

H. Brewster Jennings, one of the first marine transportation men to be called into Government service in the early stages of the war, has returned to Socony-Vacuum Oil Co., Inc., New York, to have charge of the company's transportation activities. With his return he was re-elected a Director. During his Government service he served in charge of tanker operations, first for the U. S. Maritime Commission and later with the War Shipping Administration.

Master, Mates & Pilots New Quarters

The new San Francisco headquarters for the Master, Mates and Pilots, located at 205 California Street, will be one of the finest seamen's offices and recreational centers on the Pacific Coast. The Association acquired the two story building which is close to many of the "key" contact offices connected with shipping and is adjacent to the waterfront.

Joshua Hendy Promotions

With the resignation of A. J. M. Baker on August 31, as general manager of the Crocker-Wheeler Division of the Joshua Hendy Iron Works, Captain E. D. Almy, assistant general manager was promoted to fill Mr. Baker's vacancy. Mr. Baker left the Hendy concern to assume the vice presidency and general managership of the E. W. Bliss Company.

Succeeding to Mr. Almy's post was Harry C. Gunetti who will make his offices in the Sunnyvale plant, while Robert Mann succeeds to the office of Mr. Gunetti. Clifford Sayre moves up to Mr. Mann's former post.

Merchant Seamen Honored

Highest award of the Merchant Marine — Distinguished Service Medal—was pinned on the uniforms of two well known San Francisco officers, Captain Edward E. Johnson and Chief Officer Albert E. Milbourne.

The signal tribute is for heroism of the two mariners in running their ship, the SS Admiral Halstead, for nine successive nights past Jap raiders into embattled Darwin, Australia, delivering sorely needed gasoline. This action occurred in the early days of the Pacific war.

Atlas Imperial Diesel Engine Co.'s Western Division regional sales office and showroom in San Francisco is at 102 New Montgomery Street, with William M. Griffith, sales manager, in charge.

J. M. Cook
Manager, Cutler-Hammer, Inc.

Cutler-Hammer Announces New San Francisco Manager

Cutler-Hammer, Inc., pioneer electrical manufacturers, Milwaukee, announces the appointment of J. M. Cook as manager of the San Francisco district sales office.

John Marvin Cook was graduated from the University of Minnesota in 1928 with the degree of B.S. in electrical engineering. He joined the Cutler-Hammer organization in August of 1928, completed the company's Student Training course, and entered the headquarters sales department. In 1929 he joined the Milwaukee District Sales office as an application engineer. In 1933, Mr. Cook transferred to the Cincinnati District office where, for the past 11 years, he has been handling industrial sales to manufacturers of electric motors, motor driven machinery, machine tools and to the steel mills of the Cincinnati district.

He has handled the sale of all Cutler-Hammer products for all classes of industry, and is well known in the Cincinnati area as an outstanding motor control application specialist.

The San Francisco District office has charge of the sale of all Cutler-Hammer apparatus in that territory which includes Northern California, Western Nevada and part of Oregon.

NECROLOGY

Admiralty Attorney Passes

Edwin H. Duff, prominent admiralty attorney and well known to the shipping fraternity in San Francisco, passed away in Washington, D. C. recently following a brief illness. He was 70 years old. Following his graduation at Georgetown Law School in 1897, Mr. Duff became active in working for and developing a strong American Merchant Marine. He was instrumental in founding the American Merchant Marine Institute, the Lake Carriers Association and other shipping groups. He is survived by his mother, wife, a daughter and two sons, all of whom reside in Washington.

Homer Saye Passes

Pacific Coast marine circles were shocked by the sudden death of Homer A. Saye, general freight agent for the Matson Navigation Company in Los Angeles. Mr. Saye was stricken while driving his automobile to his office and expired before a physician could be summoned.

He was born in Athens, Georgia 53 years ago. Mr. Saye was once representative of the United States Shipping Board in Washington, D. C. He served with the Los Angeles Steamship Company for 21 years until the Matson absorbed the Los Angeles concern.

Comdr. Carl E. Petersen, USNR, Passes

News of the death of Commander Carl E. Petersen, USNR, on July 23, came as a great shock to his many friends in the shipbuilding fraternity of the Pacific Coast.

Commander Petersen's experience in marine engineering and naval architectural posts was extensive; it

included the Army Transport Service, U. S. Shipping Board, U. S. Mail Steamship Co., and the supervision of the reconditioning of the Washington, and the America, after the first world war. For five years he was in charge of the Construction Department of the United States Lines. He joined the Newport News Shipbuilding and Dry Dock Co. and was assistant to the President of that firm.

In 1938 he came to the Pacific Coast as assistant manager, Contsruction and Repair Department, Matson Navigation Company, and at the outbreak of the war he was ordered to the Hawaiian Islands to assist in the repair of the damaged naval vessels. At the time of his death, he was supervisor in charge of the construction of all U. S. Navy vessels in the district of Tampa, Florida.

Harold Smith

The shipping world was saddened by the death, on August 11, of Harold C. Smith, vice president of Williams, Dimond & Co.

He was born in Chicago in 1887 and passed on at his Glendale, California home after an illness that started with a heart attack in 1941. He was former president of the Los Angeles Steamship Association, a charter member of the Propeller Club of the United States, Port of Los Angeles-Long Beach. He opened Williams, Dimond offices in the South in January 1924.

Pacific MARINE REVIEW

OCTOBER 1944

ROPE TRICK

INVASION VERSION

The gentleman performing this "rope trick" happens to be a British Tommy—demonstrating how he and thousands of his American, French and Russian buddies are crossing streams and other obstacles in the way of the invasion armies now putting the finishing touches on Mr. Hitler.

Because rope is serving jobs like this on every front where Allied armed forces fight, it is naturally scarce on the home front. Even as V Day grows closer, fiber supplies are still in enemy hands so continued rope conservation is still vitally necessary.

When you must replace rope — replace with the rope that will give you maximum wartime as well as peacetime "mileage" — specify the names TUBBS or PORTLAND (in the Northwest) to your supplier.

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these famous rope trademarks that stand for dependability in the Marine field.

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Official Organ

Pacific American Steamship Association

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Shipowners Association of the Pacific Coast

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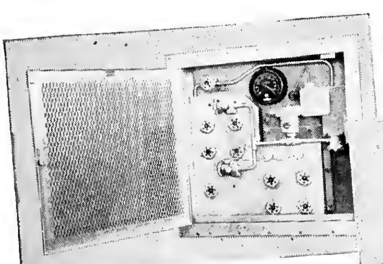
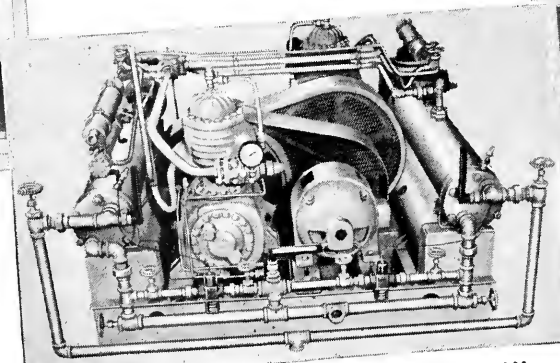
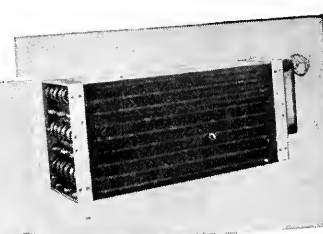


G-E CONTROL CABINETS are complete, tamper-proof units for controlling temperatures in individual refrigerated spaces.



HEART OF MARINE REFRIGERATION is the "Scotch Giant" Refrigerating machine. Unit shown is a duplex type developed by G-E specifically for marine service. Single units also available.



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Marine Refrigeration by

GENERAL ELECTRIC

Hear the General Electric Radio Programs: The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 p.m., EWT, NBC..."THE WORLD TODAY" News, Every Weekday, 6:45 p.m., EWT, CB

U. S. M. C. Honors Pacific Ship Operators

Pacific MARINE REVIEW

On Victory Fleet Day, Wednesday, September 27, at San Francisco's City Hall, was staged a ceremony during which the United States Maritime Commission, in the person of Commissioner John M. Carmody, cited 34 Pacific Coast steamship operating firms for efficient and brilliant achievement in the overseas transport of men and materiel.

Mr. Carmody, in a very happy mood and faced by one of the most representative gatherings of the shipping industry ever assembled in San Francisco, made the following remarks extempore:

"It is a genuine pleasure to come to San Francisco on this very special occasion. Your master of ceremonies and your mayor have already reminded you of something that you know very well—that San Francisco is one of the most important ports on this continent. It is important in peacetime and it is even more important in wartime.

"I should like to take just a moment to say something about this Merchant Marine that we are here today to honor.

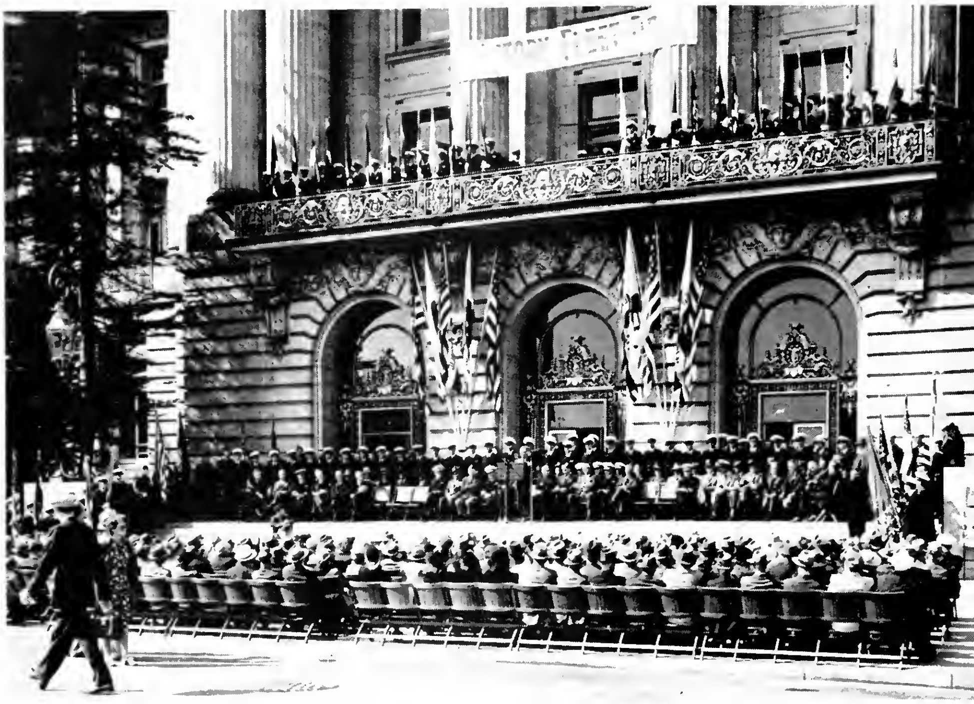
"You in San Francisco are aware of what happened to the shipbuilding program, because you live in the midst of one of our very largest developments. The fact is that when we went into the war we had approximately 11 million deadweight tons of shipping. Great Britain, when she entered this war, had approximately 22 million deadweight tons. Our task was to build nearly 40 million tons. You are aware of the fact that in 1942 in the American shipyards more than 8 million deadweight tons of shipping were built, and in 1943 just under 20 million tons; and this year probably about 16 million tons will be built—much of it in yards that did not exist in 1940.

"Similarly, the operating companies have had to expand their staffs. They have had to increase their efficiency from top to bottom, as have all of the ports and as have all of the port facilities.

"Now the significant thing about this whole development up to this time is that almost 16 billions of dollars have been invested in these enterprises in the brief period of three and one-half years. Where did that 16 billion dollars come from? That 16 billion dollars came from the American people. Every man, woman and child who buys a war stamp or a war bond participates in the payment for these ships that are sailing the seas. Every man and woman who pays an income tax; every man and woman who buys a cigarette, because all cigarettes carry a stamp; and someone has said that if you buy a bottle of bourbon you will find a Federal stamp on that bottle, that was purchased from the Internal Revenue Bureau of the Treasury of the United States.

"These vessels now belong, and these shipyards belong, to the American people. It is your responsibility, therefore, and it is our responsibility on the Maritime Commission as trustees, to see that they are used to the very best advantage. These ships will be sold. Many of the men on this platform will participate in the purchase of these ships. They will buy them. They will operate them. They will own them as privately-owned and operated enterprises after the war.

"In connection with these ships and their operation there has been developed training schools and courses for sailors, stewards, oilers and all the other branches of the seafaring life.



Victory Fleet Day at San Francisco's famed City Hall. The young men on the balcony are U. S. M. M. cadet midshipmen from the cadet basic training school in San Mateo, Calif. Each holds a house flag. As the name of an operator was cited, his flag was lowered and raised again. The uniformed line back of the speakers is composed of officer up-grade candidates from the officers' school at Alameda, Calif. U. S. Maritime Commissioner John M. Carmody is at the mike.

"Young men from high schools, from farms, from villages, from stores, are being trained in this old (but to them new) trade. Many of them will want to follow the careers after the war that they have prepared themselves for.

"Now, the question is, how will these ships be used? How will the skill of these young men be used? How will the skills of these operating companies be used after the war? They will be used only if we, the American people, realize the importance of a merchant marine to our commerce and to our future defense. It is your business and mine. It is the business of every citizen in the United States to be informed about the relationship of the merchant marine to our total economy, and to be informed in such fashion that he or she will help Representatives in the Congress to formulate fair judgment, and programs for a shipping and commerce merchant marine that will produce ultimately an American merchant marine the equal of any in the world, and sufficient to meet all of the demands of American commerce.

"I have the honor today to read to you a telegram which the President sent to Vice Admiral Emory S. Land, who is Administrator for the War Shipping Administration and Chair-

(Please turn to page 108)

FIRMS RECEIVING PENNANTS AND THEIR REPRESENTATIVES

Alaska Packers Association	R. E. Astrup
Alaska Steamship Co. (Grace Line Agents)	F. L. Doelker
Alaska Transportation Co.	Captain H. Sievers
American-Hawaiian Steamship Co.	Dearborn Clark
American Mail Line, Ltd.	Miss D. E. Watson
American President Lines	M. J. Buckley
Burns Steamship Co.	Captain J. Ramselius
W. R. Chamberlin & Co.	W. R. Chamberlin
Coastwise (Pacific Far East) Line	Captain V. D. Trout
De LaRama Steamship Co. Pacific Atlantic Steamship Co.	H. H. Pierson
General Steamship Corporation Ltd. Northland S. S. Co. (General SS, Agents)	Captain A. T. Hunter
Grace Line	F. L. Doelker
James Griffiths & Sons, Ltd.	G. V. Weber
Hammond Shipping Company	R. C. Robinson
Interocean Steamship Corp.	Eric Krag
Isthmian Steamship Lines	Arthur Blake
Luckenbach Steamship Co., Inc.	V. P. McMurdo
Matson Navigation Company	Hugh Gallagher
McCormick Steamship Co. (Division Pope & Halbot, Inc.)	J. A. Lunny
Moore-McCormack Lines	K. C. Tripp
Norton-Lilly Management Corp.	Herbert A. Wickens
Oliver J. Olson Steamship Co.	E. Whitney Olson
Olympic Steamship Co.	J. C. Strittmatter
Shepard Steamship Co.	F. C. Ninnis
Sudden & Christenson, Inc.	L. C. Steward
United Fruit Company	Frank Cook
United States Lines	Captain V. D. Trout
Weyerhaeuser Steamship Co.	W. A. Springer, Asst. P. C. Mgr.
Deconhil Shipping Co.	J. J. Coney
Pacific Tankers, Inc.	Andrew Neilsen
Standard Oil Co. of Calif.	J. L. Hanna
Tide Water Associated Oil Co.	H. B. Haney

VICTORY FLEET DAY

Los Angeles—Long Beach

Charles A. Dostol, vice president, Westinghouse Electric & Manufacturing Company, San Francisco, principal speaker.

At the Biltmore Hotel, Los Angeles, the principal shipping men of Southern California assembled to witness the War Shipping Administration citation of and the award of pennants to 17 shipping firms and agencies operating under W.S.A. in Los Angeles Beach area.

The lunch and program was sponsored jointly by: Propeller Club of the United States, Port of Los Angeles-Long Beach; Los Angeles Steamship Association; Bilge Club; Foreign Trade Association of Southern California; Los Angeles Transportation Club; Women's Traffic Club; World Trade Committee of the Chamber of Commerce; Custom House Brokers Association; and the Merchant Marine Post of the American Legion.

The firms cited and the representatives receiving the pennants are shown in the list herewith.

Charles A. Dostal, vice president, Westinghouse Electric and Manufacturing Company, delivered the keynote address. Following is an abstract of his remarks:

"The War Shipping Administration has named this day, Wednesday, September 27, Victory Fleet Day— **to celebrate, and pay tribute, to honor the American Flag Lines and General Agencies' amazing accomplishments, of the most complex, complete and dangerous transportation achievements recorded in world history.**

"We pay tribute today to our Victory Fleet, to the undreamed of and amazing construction record back of this Fleet, which since the launching of the Patrick Henry (the first Liberty ship built on September 27, 1941), has produced in these short three years more than 3600 vessels.

"On this day the nation honors the steamship companies of the United States who are maintaining the global lifeline to the flaming battle fronts and who are operating this greatest fleet of Merchant Marine ships of all time.

"Every half-hour around the clock, under .control of the W.S.A. and operated by private shipping companies, a ship heavily laden with war goods leaves the United States. Our war export is more than 5 million long tons every month—our imports more than 2 million tons. The battle of supply has been won. The stream of war supplies, getting them there on time on the battlefronts of seven seas is ceaseless and never-ending, as our boys and our Allies close in on Berlin and Tokyo.

"Victory Fleet Day, it is hoped, will bring home to millions of Americans the significant fact that our enormous overseas Merchant Fleet today is being operated not by the W.S.A. —which has only strategic control of shipping for the duration of the war —but by private steamship companies. To these companies we pay homage and tribute for their materful accomplishments.

"The W.S.A. points out that in this great movement of materials to all parts of the earth, despite handicaps, under which shipping companies were forced to operate, there has not been a single failure of shipment for any cause that could be ascribed to the operators, nor has there been an essential cargo left on the dock, for lack of shipping space.

"Specific responsibilities of ship operators in this war have been to see that the ships are kept sailing, loaded with cargo, and with full and competent crews aboard. They have had great assistance from the Maritime unions, and training- and recruitment organizations of W.S.A. W.S.A. recognizes and appreciates the full support lent these vital recruitment programs by the press and radio facilities of the country, at no cost to the Government. The stevedoring organizations, the unions have all cooperated fully and patriotically, in cargo and loading problems. So effective have been these combined efforts, that today there is maintained a 24-hour daily average, of a sailing every 30 minutes, of ships outwardbound with our goods of war.

(Please turn to page 108)

FIRMS RECEIVING PENNANTS AND THEIR REPRESENTATIVES

American-Hawaiian Steamship Co.	Fred Hooper
American President Lines	Edgar M. Wilson
American-West African Line Inc., Local Agency, Burns Steamship Company	Val Larsen
Barber Steamship Company	Bernard Gibney
De LaRama Steamship Co., Inc.	Hugh Middleton
General Steamship Corp., Ltd.	Captain H. H. Birkholm
Grace Lines, Inc.	W. A. St. Amant
Interocean Steamship Corp.	Walter Wilkinson
Isthmian Steamship Co.	W. C. Fulton
Luckenbach Steamship Co.	E. A. MacMahon
Matson Navigation Co.	Ralph Chandler
McCormick Steamship Co.	Kenneth Pope
Moore-McCormack Lines	Leo Archer
Norton-Lilly Management Corp.	Harry Dorr
Sudden & Christenson	Lloyd Richards
United Fruit Co.	J. V. Eem
United States Lines	Dee Baker

View of hull of AP122, sister ship of USS Admiral W. S. Benson, at her outfitting dock.

Bethlehem Delivers Largest Pacific-Coast-Built Ship

Text, illustrations and plans released by U. S. Maritime Commission and U. S. Navy.

A lifeboat and davit against the sky.

After successful sea trials, the Bethlehem-Alameda Shipyard Inc. has delivered to the U. S. Maritime Commission the USS Admiral W. S. Benson, the first of a series of P2-SE2-R1 troopships for the U. S. Navy.

These ships are especially interesting to the Pacific Coast for two reasons; first, they are the largest commercial vessels ever built on the Pacific Coast; and second, the design is fundamentally a modern passenger liner based on the lines and arrangements peculiarly suited to Pacific Ocean routes.

The general characteristics of the hull are shown in the table herewith.

Constructed of steel, the vessel is

fitted with a curved stem and a cruiser-type stern with twin screws. There are five structural decks in the hull. Two of these — Promenade Deck, and A Deck—are continuous from stem to stern. B deck is continuous from stem to after peak bulkhead and steps up between after peak bulkhead and stern. C Deck is continuous from the forepeak bulkhead to after peak bulkhead. D Deck extends from No. 2 hold to the forward machinery space bulkhead and from the motor rooms to the after peak bulkhead. Deck erections above the promenade deck and arrangement of all deck spaces are plainly shown on the profile and deck plans reproduced herewith. Construction is largely by arc welding, with approximately 350,000 rivets and hull joints.

The Promenade Deck is the strength deck. Hull space below this deck is divided into compartments by watertight bulkheads. These bulkheads, taken in conjunction with the continuous double bottom extending from forepeak bulkhead to bulkhead at frame No. 172, make this hull a safe, seaworthy structure and give "two-compartment" subdivision under the latest "safety at sea" rules.

As shown, the vessel is arranged and fitted for the transport of troops together with officers and ship's crew. All troop quarters are fitted with Army-type berths with vertical spacing according to Navy standards. Messing facilities for troops are on the cafeteria system, with mess tables on A deck. A large galley serves the cafeteria spaces.

Two messrooms are provided for officers, and a separate galley serves these rooms. All crew, troop and officer living spaces are adequately supplied with ventilation, heating, cooling and illumination.

Turbo-electric propulsion machinery is used, two separate sets of units being installed. Four water tube steam generators furnish the steam. These steam generators are erected in pairs. Each pair furnishes steam for one turbo-electric generator. Each generator is so connected to its switchboard that it can be used to furnish power to either or both propulsion motors. Each propulsion motor is directly connected to a propeller shaft.

These vessels with their equipment and propulsion machinery are being built to the highest class rules under special survey of the American Bureau of Shipping. This means that all rules and regulations of all governing

Principal Characteristics

Length Overall	610′ 0″
Length Waterline	590′ 0″
Length B. P.	573′ 0″
Beam Molded	75′ 6″
Draft Max. Molded	30′ 0″
Draft Scantling	29′ 0″
Depth Prom. Deck	52′ 6″
Depth A Deck	43′ 6″
Depth B Deck	34′ 6″
Displacement at Scantling Dr.	22,380 tons

Federal agencies are met or bettered. These agencies include:

Division of Marine Inspection, U. S. Coast Guard

International Load Line Convention

U. S. Public Health Service

International Convention for Safety of Life at Sea

Senate Report No. 184

U. S. Customs Admeasurement

Panama Canal Regulations

All construction, equipment, material and workmanship is subject to the inspection and approval of the U. S. Maritime Commission.

Ventilation and Heating

Problems connected with ventilating, heating and lighting a vessel designed to transport comfortably a small army of men, are rather complicated in any case, but when that vessel is for war use and must be so fitted that it can be completely blacked-out, these problems become very complex. These vessels have no side lights or air ports below the Promenade Deck. Minimum requirements for summer ventilation were set at:

40 cu. ft. per minute per occupant in officers' spaces;

30 cu. ft. per minute per occupant in crews' spaces;

Bird's-eye view of USS Admiral W. S. Benson at her outfitting dock, with steam up ready for trials.

25 cu. ft. per minute per occupant in troop spaces.

Capacity of combined mechanical and natural ventilation is sufficient to effect a complete change of air in all living quarters in from 4 to 6 minutes. This capacity is based on gross volume of spaces without deducting for volume of furnishings or other equipment. There are 106 separate ventilating systems with a combined capacity to circulate 34,000,000 cu. ft. per hour.

Heating requirements are based on maintaining 70° F. inside temperature at 0° F. outside temperature—with the exception of inside temperatures and spaces as follows:

Hospital, 75° F.

Operating Room, 85° F.

Working Spaces, 60° F.

Passageways, 65° F.

Thermostatically - controlled preheaters and tempering heaters are installed in mechanical air supply systems to maintain these temperatures.

Fire Equipment

Elaborate fire detection and fire extinguishing systems are installed. Detection systems include:

(A) Visible and audible smoke detection, covering all cargo spaces, stores spaces, paint and locker room, carpenter shop, and oil lockers. Where practicable this system is combined with the carbon dioxide extinguishing system.

(B) All machinery spaces are provided with a manual fire alarm system.

Fire extinguishing is accomplished by three methods—water, CO_2, and portable extinguishers. The fire water mains are carried to hydrants strategically located so that every part of the vessel may be reached by streams from two fire hoses. These mains are served by fire pumps of capacity sufficient simultaneously to supply eight 2½-inch fire hydrants at the rate of 150 gpm per hydrant.

Each main engine room, the emergency generator room, the enclosed ventilating systems of the electrical machinery, and the spaces described above as fitted with the smoke detection system, are all covered by a CO_2 fire smothering system with groups of CO_2 cylinders cross connected to allow distribution to any or all of these spaces.

Portable fire extinguishers of approved types are installed in approved racks and in ample capacity in all spaces where special fire hazards indicate their usefulness.

Safety Equipment

Boats are provided as follows: Two 31′ 8″, 60-person motorboats. In addition, the vessel is equipped with life floats to accommodate her full complement of troops, crew and officers, plus 25 per cent spares. Life preservers are provided for the full complement plus five per cent.

All boats are handled under gravity type davits provided with electric boast hoists.

Main Propulsion Machinery

As already stated, these vesseles are propelled by twin screws driven by electric motors. Power is derived from four water tube oil-burning boilers fitted with convection type superheaters, air preheaters and counterflow economizers. The specified ratings for each of these boilers are:

air and gas tight under normal pressure of the forced draft blowers. With an ambient temperature of 100° F., the outside of this casing is maintained at less than 130° F.

Combustion is under forced draft and is regulated by automatic combustion control. This control mechanism responds to the main steam pressure and regulates the supply of air and the supply of fuel to boilers. A thermo - mechanical type feedwater regulator controls the flow of feedwater into these boilers and maintains an excess feedwater pressure over steam drum pressure.

Each boiler has a forced draft fan operated by an electric motor and taking air from the machinery space. This air is forced through air heaters to the furnace fronts. An independent air heater for each boiler heats this combustion air from 100° F. to 225° F. using steam bled from the main turbine at 25 psi.

Four oil burners maintain furnace temperatures in each boiler. This steam generating plant is equipped with water gages which indicate to the water tender the level of water in the boiler, smoke indicators which show the nature of the fumes in the uptakes, soot blowers which clean accumulations from the fire side of tubes and baffles.

Note in the boiler characteristics that the fuel consumption under normal load is set at a maximum of 2910 lbs. of 18,500 Btu oil fuel per hour for each boiler, or 11,640 pounds per hour for the four boilers. Comparing this figure with the normal designed shaft horsepower delivered to pro-

Boiler Characteristics

Rating	Normal Load	Overload
Evaporation	40,000 lbs/hr.	44,000 lbs/hr.
Superheater Outlet Pressure	600 psi	600 psi
Superheater Outlet Temp.	825° F.	850° F.
Feed Temp. to Economizer	240° F.	240° F.
Air Temp. to Burners	225° F.	225° F.
Desuperheater Outlet Pressure	600 psi	600 psi
Desuperheater Outlet Temp.	525° F.	535° F.
Evaporation Desuper. Steam	2500 lbs/hr.	2750 lbs/hr.
Fuel Consump. at Normal load	18,500 Btu oil not over 2910 lbs/hr.	

These boilers are designed with water walls and each boiler and the sides of its economizer are enclosed in a rigidly constructed well-insulated sheet steel casing that is practically

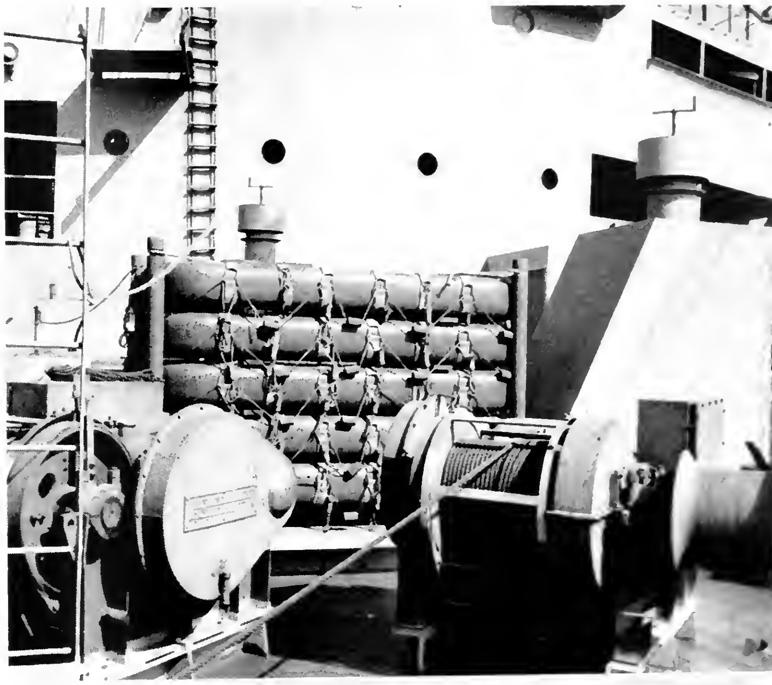
pellers it is plainly evident that this steam generating plant has at the boiler outlet set a fuel economy of less than 0.65 pounds of 18,500 Btu oil per brake horsepower hour for all purposes. Any type of prime mover that will transform the heat energy of its share of this steam into that shaft horsepower will have an over-all fuel economy of not more than 0.65 lb/shp.

This fuel economy of steam generating plants is possible only with the most careful design of burner, boiler, economizer and air preheater. It brings the marine steam generator up into the same class of overall efficiencies as the large central station plants.

Superheated steam from each pair of boilers goes directly into one of the main propulsion turbine-generator sets. The turbines are of the impulse type and normally operate with throttle steam about 590 psi and 815° F. total temperature, and exhaust to the condenser at a vacuum of 28¾" hg, with injection temperature for the cooling sea water at 70° F.

From the well at the bottom of condenser the condensate is pumped through a low-pressure feed heater unit which includes a drain cooler, a first stage heater, and the inter, gland, and after condensers of the main and auxiliary air ejectors. The diagram herewith shows the order of the passage of condensate through these heat exchangers. Absorbing heat as a cooling medium in the condensers and cooler, it arrives at the first stage heater with a temperature about 100° F. This heater uses bleed steam at 188° F. and heats the condensate to 175° F. From this heater the condensate goes directly to the direct contact deaerating heater. This heater, operated by bleed and exhaust steam at 10 psi, removes all entrained air and raises the feed temperature from 175° F. to 240° F. The deaerating heaters receive drains from steam systems all over the ship. These heaters are installed well up in the engine room space and form a hot well with a positive head on the suction of the feed pumps. Each heater has a hot feedwater storage capacity of 1500 gallons.

This is the steam system of the main propulsion turbines and it is a very interesting and rather startling fact that the steam in such a plant starts from the boiler at a temperature hot enough to ignite a stick of wood, comes out of the condenser as water at a temperature too cool for a warm bath, and is back in the boiler again as steam in a very small fraction of a second. The steam system for the auxiliary turbo generating sets follows the same pattern, and is shown on the diagram herewith.

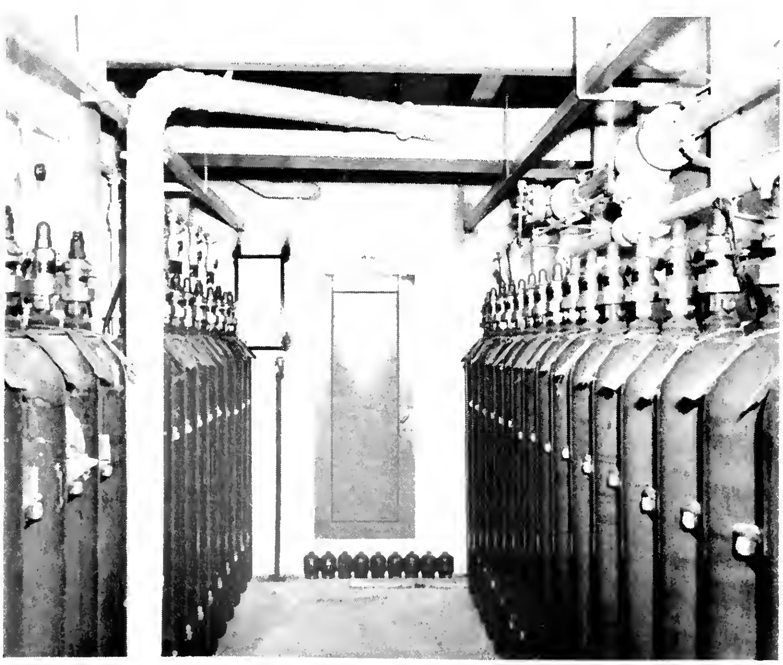


Upper: Cargo winches and a stack of balsa life floats. Lower: Bow of the AP122 at outfitting dock. Note windlass, chain and anchor.

Each of the main propulsion turbo-electric units was designed and rated for continuous operation at ... 500 shp output running 3715 ... with steam at about 585 psi ...

A ventilating blower.

Batteries of CO_2 cylinders for fire extinguishing systems.



840° F. total temperature. Each main turbo-generating set is lubricated by an independent lube oil system. This system includes: One 1000-gallon storage tank, one 1000-gallon settling tank, two 500-gallon gravity tanks, one sump tank, one 50-gallon sludge tank, one cooler, one lube oil purifier, one heater, one motor-driven service pump, one standby pump, one hand pump and the various fittings, equipment and piping necessary for its efficient operation.

The main generators are direct connected to the turbines and are normally rated 6890 kw on 1.0 power factor 3500 volts, 3 phase, 60 cycle, a.c., 3600 rpm. They are designed to operate continuously at 7650 kw and 3715 rpm. Excitation for the generator is provided by 120-volt d.c. current from the 240/120 three-wire d.c. generators connected to the auxiliary turbo-generating sets. Each main propulsion generator has a totally enclosed ventilating system. In this system circulation of the air is forced by a fan that is integral with the generator rotor. After absorbing heat from the generator, this air passes through a heat exchanger of the tubular type mounted below the generator frame. In this heat exchanger the air is cooled by the circulation of sea water supplied from the circulating system of the main condenser. With an ambient of 40° C., the armature must not rise above 60° C. or the field above 85° C.

Each generator is connected through a main control panel and a transfer panel to one or both of the main propulsion motors so that on full power operation one generator and one motor form an electrical speed reduction unit between one turbine and one propeller shaft, and on reduced power operation either generator and both motors form a speed reduction unit between one turbine and both propeller shafts. This flexibility of control enables the electric drive to get full fuel economy at cruising speeds, and is its great advantage over the mechanical speed reduction units.

Boat deck views. The top picture shows one of the two motor lifeboats in its davits. Center photo shows bridge and wheelhouse top from the boat deck. Bottom picture shows stacks of balsa life floats.

Each propulsion motor is directly connected to its propeller shafting through thrust bearings of the two-shoe pivoted segmental type.

Auxiliary Power

Auxiliary electric generating system consists of four turbo-generators installed two in each main engine room. Each of these turbo-generator sets consists of a turbine driving through reduction gearing two generators on a common shaft. One generator is rated 500 kw, 450 volt a.c., and the other generator 200 kw, 240/120 volt d.c. Each turbine takes steam at 590 psi and 815° F. total temperature, and exhausts to its individual condenser at 28¾" hg.

Any three of these generating sets can adequately carry the combined sea load without exceeding 90 per cent of their combined ratings.

All auxiliary machines on the ship, with the exception of the main boiler feed pumps and one reciprocating feed pump for contaminated water evaporator, are operated electrically. The main feed pumps are multi stage centrifugals driven by turbines taking desuperheated steam at 575 psi and 500° F. total temperature and exhausting at 15 lbs. gage pressure to the deaerating feed heater and the evaporating plant. Each main feed pump has a capacity to deliver 225 gpm against a head of 725 psi.

For emergency lighting and power a 75-kw diesel generating set is installed and arranged for electric starting from suitable storage batteries. The generator on this set is a 450-volt, 60-cycle, 3-phase a.c. machine. Switchboard control of this unit provides for automatic starting and automatic transfer of emergency light and

power circuits under emergency conditions.

Terminals are installed for shore connections to 450-volt a.c. circuits and also to 120/240-volt d.c. circuit.

The total connected motor load on the ship's circuits is over 3500 hp.

Deck Machinery

A dual ram four-cylinder slide type hydraulically operated electrically controlled and actuated steering gear handles the rudder. There are two independent electro-hydraulic power units, either of which is capable of moving the rudder from hard over to hard over in 30 seconds at full speed ahead or in 60 seconds at full speed astern. Each of these units is operated by a 90-hp motor. The rudder may be operated independently by either ram, and arrangements are installed for automatic transfer to the emergency electric circuits under the diesel generating set.

Distant control of these steering motors is effected by either a telemotor hydraulic system for manual operation or by a gyro pilot electrical transmission system. Steering stations are located: in the wheelhouse; on top of the wheelhouse; on the after deck; and in the steering gear room.

Anchors are handled by a horizontal shaft type electric drive combined windlass and warping winch. This windlass handles (at 30 feet per minute from a depth of 30 fathoms) the combined weight of two stockless cast steel bower anchors at 15,575 lbs plus 120 fathoms of 2⅝-inch stud link anchor chain for each anchor. The gypsy head gives a line pull of 20,000 lbs at 30 feet per minute. The motor is rated 100 hp, 230 volts d.c. at 600 rpm.

Eight single-speed and two 2-speed cargo winches are installed as shown on general arrangement, each driven by a 50-hp, 230-volt d.c. motor running 600 rpm and acting through double reduction gearing of the herringbone type. This gearing is enclosed in an oiltight casing and runs in oil.

Two boat winches are provided for hoisting the lifeboats. Motors are rated 25 hp, 440-volt, 3-phase, 60-cycle, for the lifeboat hoists. Two vertical shaft type electric drive capstans are mounted on the weather deck as shown, with their motors and motor controls mounted on the deck below. These are each driven by a 35-hp, 230-volt d.c. motor at 600 rpm, driving through pinions and spur gears and a worm and worm gear, all completely enclosed in an oiltight case. The capstan head is designed to handle eight ½-inch-circumference manila hawsers and has capacity to exert 20,000 pounds' pull at 30 feet per minute.

Navigating Equipment

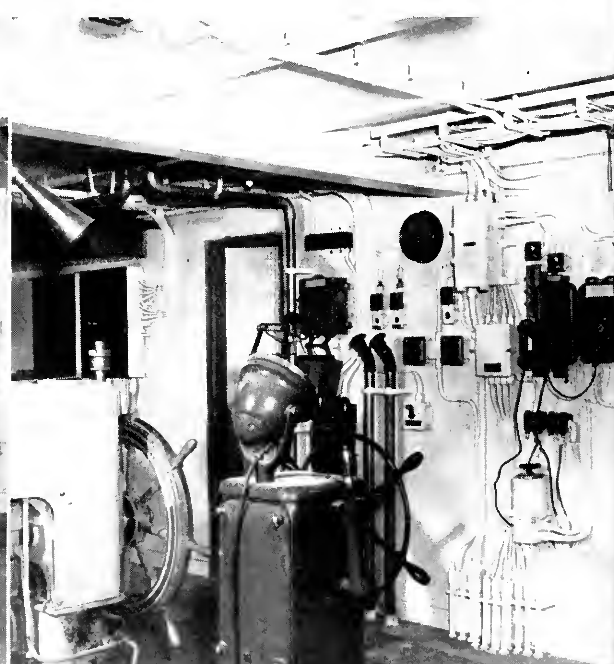
A complete gyro compass system is installed, including master gyro and seven steering and bearing repeaters located as follows: a steering repeater on the wheelhouse top; a steering repeater in wheelhouse; a steering repeater in steering gear room; a steering repeater at after steering station; a bearing repeater on each wing of the bridge; and a bearing repeater in the radio direction finder. A 7½" Navy standard compass and commercial binnacle is mounted on top of house, and 8" steering compasses and binnacles of the same type are installed in the wheelhouse and the after steering station.

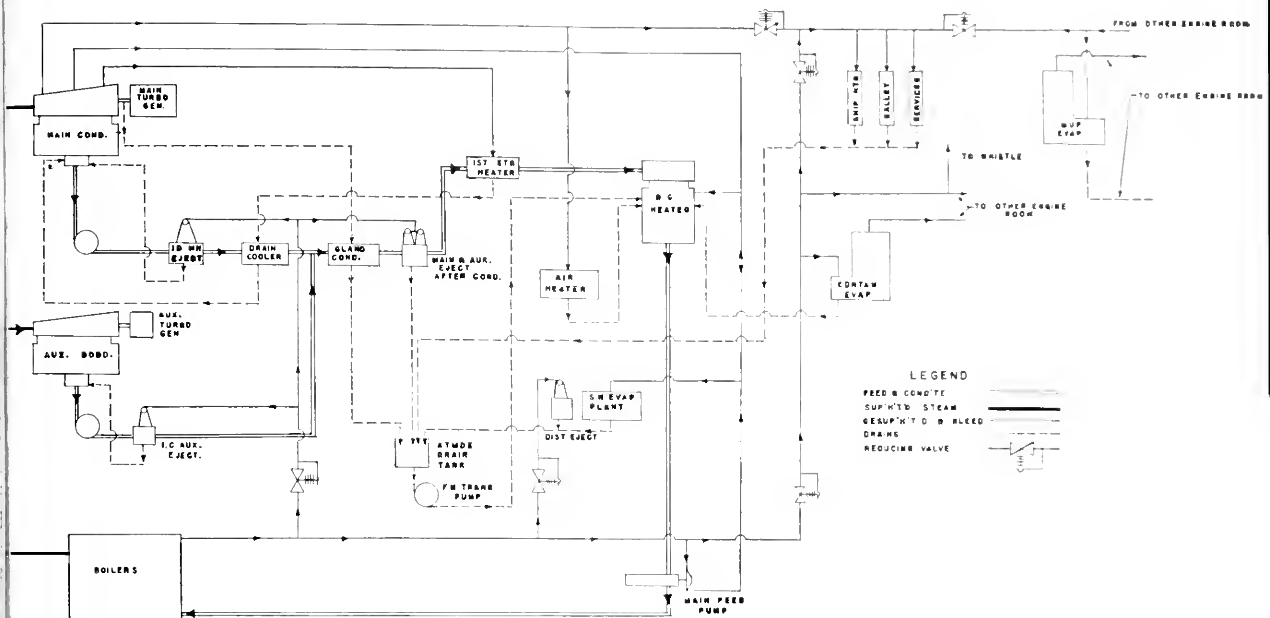
In the chart room a gyro course recorder makes a 30-day record of the ship's course. Here also are installed the radio direction finder and the recording indicator of the Fathometer echo sounding device. The visual indicator of the Fathometer is installed in the wheelhouse.

Refrigeration

Refrigeration of the Freon-12 direct expansion type is installed to take

Views in wheelhouse, featuring steering telemotor, gyro pilot, engine telegraph, gyro compass repeaters and instruments, wiring and piping on after bulkhead.





Steam balance diagram.

care of the refrigerated stores compartments, ice-making tanks, mechanical cow, and ice cream freezer, all located on D deck and tank top amidships. Widely separated spaces needing refrigeration have individual self-contained electrically-operated units. Ship's stores occupy a total refrigerated space of 26,737 cu. ft., of which 10,145 cu. ft. are capable of being held at temperatures below freezing, and cooled by refrigerant coils. The spaces held above freezing temperatures are cooled by circulating cold air.

Table of suction and discharge connections of pumps.

CONNECTIONS / PUMPS	SEA	MAIN CONDENSER	MAIN LUB OIL COOLERS	MAIN GEN AIR COOLERS	EMERG ENG ROOM BILGE SUCTION	AUXILIARY CONDENSERS	AUXILIARY LUB OIL COOLERS	MAIN FEED TURBINE L O COOLERS	CONTAMINATED DRAIN COOLER	MOTOR AIR COOLERS	SHAFT ALLEY SERVICE	MAIN AIR EJECTOR CONDENSER	AUX AIR EJECTOR CONDENSER	DEAERATING HEATER	DISTILLED WATER TANKS	ECONOMIZERS
AIN CIRCULATING	S	D	D	D	S											
UX CIRCULATING	S					D	D	D	D							
OTOR AIR COOLER CIRC	S									D	D					
AIN CONDENSATE		S										D				
UX. CONDENSATE						S							D			
AIN FEED														S	S	D
RE	S															
IRE & FLUSHING	S															
LUSHING	S															
ILGE & CLEAN BALLAST	S															
ILGE & CLEAN BALLAST	S															
ILY BALLAST																
ILY BALLAST																
JEL OIL TRANSFER																
JEL OIL TRANSFER																
JEL OIL SERVICE																
JEL OIL SERVICE STANDBY																
JB OIL SERVICE			D													
JB OIL PURIFIER																
JB OIL HAND																
ASHING WATER																
OTABLE WATER																
OT WATER CIRCULATING																
IESH WATER DRAIN														D		
AKE-UP EVAPORATOR FEED																
INTAMINATED EVAP FEED																
STILLER CONDENSER CIRC	S															
STILLER CONDENSER COND																
W. EVAPORATOR FEED																
IINE DISCHARGE																
ESH WATER DISTRIBUTING															D	
IMING																
FRIG CONDENSER CIRC	S															
ESEL OIL TRANSFER																

CONNECTIONS / PUMPS	FIREMAIN	FLUSHING MAIN	BILGE MAIN	OVERBOARD	OIL AND WATER SEPARATOR	CLEAN BALLAST MAIN	FORD ENG RM IND BILGE SUCTIONS	MOTOR ROOMS IND BILGE SUCTIONS	BALLAST SUCT AND DISCH MAIN	BALLAST STANDPIPE	SLUDGE TANK	AFT ENG RM IND BILGE SUCTIONS	FUEL OIL SUCTION MAIN	F O SETTLING T K SUCT & DISCH MN	F O FILLING LINE	F O SETTLING TANK HIGH SUCTION
AIN CIRCULATING																
UX CIRCULATING																
OTOR AIR COOLER CIRC																
AIN CONDENSATE																
UX. CONDENSATE																
AIN FEED																
RE	D															
IRE & FLUSHING	D	D														
LUSHING		D														
ILGE & CLEAN BALLAST			S	D	D	S D	S									
ILGE & CLEAN BALLAST			S	D		S D		S								
ILY BALLAST			S		D				S D	D	S					
ILY BALLAST			S		D				S D	D	S	S				
JEL OIL TRANSFER									D				S	S D	D	
JEL OIL TRANSFER									D				S	S D		
JEL OIL SERVICE													S			S
JEL OIL SERVICE STANDBY					D								S	S		S
JB OIL SERVICE											D					
JB OIL PURIFIER											D					
JB OIL HAND											D					
ASHING WATER																
OTABLE WATER																
OT WATER CIRCULATING																
IESH WATER DRAIN																
AKE-UP EVAPORATOR FEED																
INTAMINATED EVAP FEED																
STILLER CONDENSER CIRC																
STILLER CONDENSER COND																
W. EVAPORATOR FEED																
IINE DISCHARGE				D												
ESH WATER DISTRIBUTING																
IMING																
FRIG CONDENSER CIRC																
ESEL OIL TRANSFER																

CONNECTIONS / PUMPS	F O HEATERS VIA METER	F O RECIRCULATING LINE	SAVE-ALL TANK	MAIN LUB OIL SUMP TANK	LUB OIL GRAVITY TANKS	LUB OIL SETTLING TANK	LUB OIL FILLING LINE	AUX GEN LUB OIL SUMPS	LUB OIL STORAGE TANK	WASHING WATER STORAGE TANKS	WASHING WATER SYSTEM	POTABLE WATER STORAGE TANKS	POTABLE WATER PRESSURE TANK	HOT WATER STORAGE TANK	HOT WATER CIRCULATING SYSTEM	FRESH WATER DRAIN TANK
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JEL OIL TRANSFER																
JEL OIL TRANSFER																
JEL OIL SERVICE	D	S	S													
JEL OIL SERVICE STANDBY	D	S	S													
JB OIL SERVICE				S	D	D	D									
JB OIL PURIFIER				S D		S		S D	D							
JB OIL HAND				S												
ASHING WATER										S	D					
OTABLE WATER												S	D			
OT WATER CIRCULATING														S	D	
IESH WATER DRAIN																S
AKE-UP EVAPORATOR FEED												S				
INTAMINATED EVAP FEED																
STILLER CONDENSER CIRC																
STILLER CONDENSER COND																
W. EVAPORATOR FEED																
IINE DISCHARGE																
ESH WATER DISTRIBUTING												D				
IMING																
FRIG CONDENSER CIRC																
ESEL OIL TRANSFER																

CONNECTIONS / PUMPS	MAKE UP FEED EVAPORATOR	CONTAMINATED EVAP DRAIN TANK	CONTAMINATED EVAPORATOR	DISTILLER CONDENSER	TEST TANKS	DISTILLER CONDENSER OVBD DISCH	DISTILLER CONDENSER INNER HEATER	FIRST EFFECT SHELL	SECOND EFFECT SHELL	PUMPS REQUIRING PRIMING	BILGE	REFRIGERATOR CONDENSER	DIESEL OIL STORAGE TANK	EMERGENCY GEN DIESEL OIL TANK	GALLEY SERVICE TANK	CONDENSATE COOLER
AIN CIRCULATING																
UX CIRCULATING																
OTOR AIR COOLER CIRC																
AIN CONDENSATE																
UX. CONDENSATE																
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ASHING WATER																
OTABLE WATER																
OT WATER CIRCULATING																
IESH WATER DRAIN																
AKE-UP EVAPORATOR FEED	D															
INTAMINATED EVAP FEED		S	D													
STILLER CONDENSER CIRC				D												
STILLER CONDENSER COND				S	D											D
W. EVAPORATOR FEED						S	D									
IINE DISCHARGE								S	S							
ESH WATER DISTRIBUTING	D				S											
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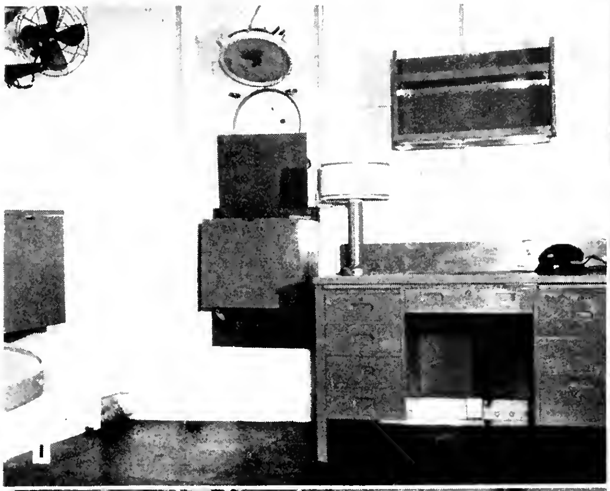
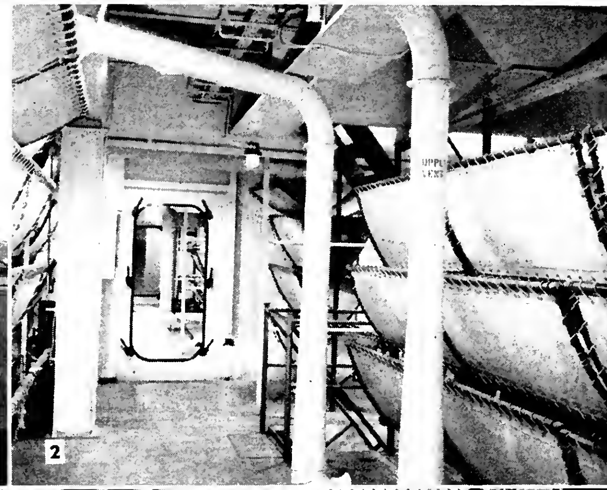
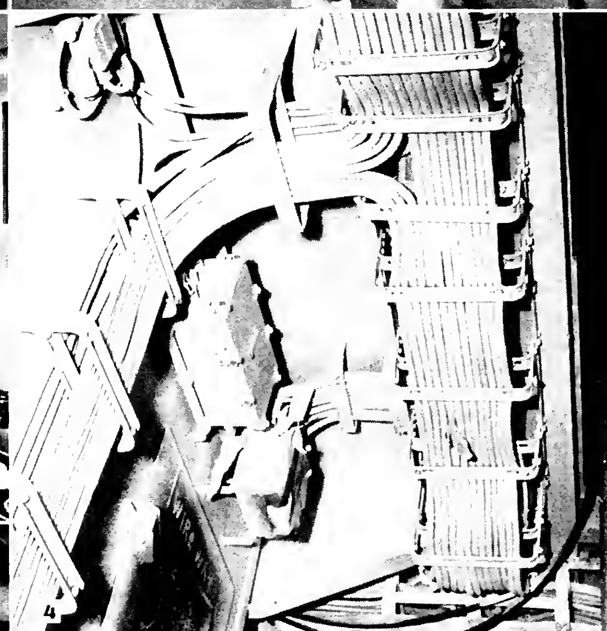
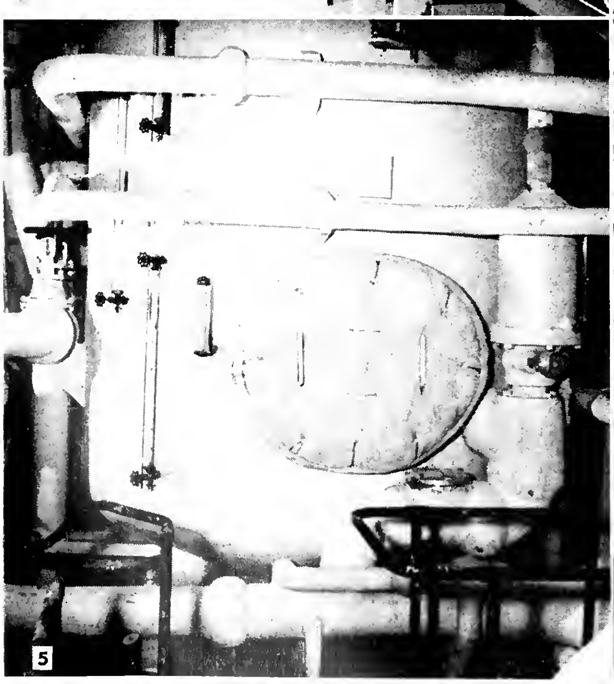
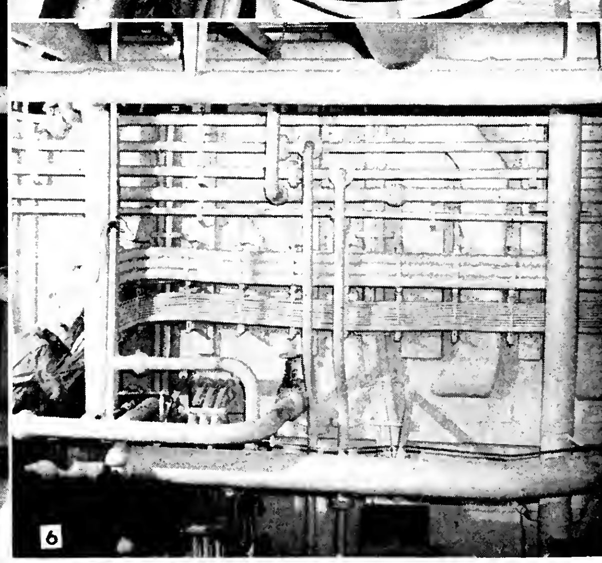
ESEL OIL TRANSFER													S	D	[illegible]	











ON THE FACING PAGE:

(1) Captain's office.

(2) A troop berthing space.

(3) Troop washroom and showers.

(4) Wiring in passage aft of wheelhouse.

(5) One of the deaerating direct contact feedwater heaters.

(6) Piping and wiring on machinery space bulkhead.

Six vertical air-cooled multi cylinder, single acting marine type Freon compressors maintain this refrigeration with one of them acting as a standby. Of these compressors, two have each a capacity of 4.37 tons refrigeration at a suction of minus 5° F., 105° F. condensing; three at 7.25 T. R. at a suction temperature of plus 15° F. condensing; one at 3.6 T. R. at a suction temperature of minus 12° F., 105° condensing. The compressors are driven by 2-speed, 15-hp motors, all through Vee belt drive.

Ice cream cabinets, self-contained refrigerating units and cabinets, and electric water coolers are provided for pantries, messrooms, cafeterias and deck use.

Conclusion

Many pages might be used in describing the various piping systems, the furnishings, the color schemes, and the culinary and sanitary equipment. However, the foregoing is enough to indicate that these vessels are modern seagoing passenger vessels, very complete and up to date in their propulsion plants, their outfit and their equipment. The illustrations show plainly that the workmanship in construction and in installation is first class in every respect and thoroughly up to Bethlehem standards. This fact is just cause for personal pride in achievement on the part of the personnel of Bethlehem's Alameda shipyard. It should also be proof to shipowners that Pacific Coast shipyards can produce modern passenger vessels of the highest class.

Machinery and Equipment Items on U. S. S. Admiral W. S. Benson

Included among the manufacturers and vendors of marine machinery and equipment to the troopship Admiral W. S. Benson are some of the best-known names in American industry. Prominent in the list are:

General Electric Company, manufacturers of the main propulsion turbo-generating sets, the main propulsion motors, the auxiliary power generating set, and the controls and switchboards in the engine rooms.

Combustion Engineering built the steam generators.

Edwards Valve and Mfg. Co. provided the various valves for operation of these steam generators.

Crosby Steam Gage and Valve Co. furnished the safety valves for the boiler steam drum and for the superheater outlet.

Thomas C. Wilson, Inc., made the pneumatic turbine drive tube cleaners that remove all scale from the inside of the water tubes of the boilers.

Todd Combustion Equipment is responsible for Hex-Press oil burners, four of which are installed in each steam generator furnace front.

Reliance Gauge Column Co. furnished the water gages.

R. Wager smoke indicators installed in the uptakes guard combustion conditions.

A. Copes feed water regulator controls the flow of feedwater to each steam generator.

Hagan Corporation installed their automatic combustion control.

Diamond Power Specialty Corporation soot blowers take care of cleaning the outside of water tubes in the steam generator.

Westinghouse Electric and Manufacturing Co. supplied the majority of the motors and their controls for driving the deck machinery, pumps and other auxiliaries.

American Hoist and Derrick Co. winches take care of loading and discharging cargo.

Radiomarine Corporation of America furnished the ship's radio and the radio direction finder.

Sperry Gyroscope Corporation is well represented on the bridge with master gyro compass and repeaters, course recorder and gyro pilot.

The Submarine Signal Co. Fathometer is installed with both recording and visual indicators.

The C-O-Two Fire Equipment Company has the smoke detection equipment and the CO_2 fire extinguishing system covering the hold spaces and the machinery spaces.

York Corporation supplied the refrigeration machinery.

Walter Kidde & Company Inc. were responsible for special CO_2 hose reel fire extinguishing equipment for the propulsion generators and the propulsion motors.

Baldt Anchor Chain and Forge Company provided the stockless anchors.

National Malleable and Steel Castings Company supplied Naco stud-link anchor chain.

Panorama of American Forge Co. Plant at Berkeley, California.

War Production Today— Peace Volume Tomorrow

Today the big plant of the American Forge Company at Berkeley, California, is working night and day on war production orders for Western industrials, supplying forgings of every description. While present-day war requirements come first, the company is looking toward the future—the great opportunity which faces the Western States and which the Pacific Coast visualizes in the export field.

The history of the company is unique in many ways, yet it follows the usual pattern of American enterprise. Every concern is founded on a need and by a man who visualizes and supplies that need. Such a man was Joseph Eastwood, who came to California in 1888.

Joe Eastwood was a blacksmith and forging expert of considerable experience. In association with a man named Wilson he bought out Day & Pracy, who were operating a small "smithy" at 109 Mission Street. The sign over the door announced "Heavy and Light Forgings." Not long after, partner Wilson died, and in 1891 the sign was changed to "Joseph Eastwood, Proprietor," with the information that he made "Crank Axles, Crankshafts, Engine Forgings, Hammered Steel Shoes and Dies." The sign also stated that the concern specialized in forgings for gas engines — this early date saw the beginnings of the great gas-engine building industry on the Pacific Coast. Joe Eastwood worked hard; he worked at the forge all day with his helpers; after dinner he attended night school to learn bookkeeping and to add to his store of knowledge. Presently the name was changed to "The American Tool Works," with Mr. Eastwood still the guiding head—but he was acquiring partners, for as soon as a smith showed a decided interest in the concern, he gave the man a chance to own a share of the business.

In April of 1906 the Great Fire that laid in ashes over half of San Francisco wiped out the physical property of Joseph Eastwood, but not his good name, his business, his ability and his will to succeed. He immediately started business again at 25 Tehama Street, and the new sign read "The American Forge Company—General Blacksmithing and Machine Forgings, Hammered Steel Shoes and Dies, Crank Axles and Shafts, Well Boring and Drilling Tools." From 1914 to 1918, during World War I, the company played an important part by serving industries which were in war production. After the war the firm grew and prospered. On July 1, 1931, Mr. Eastwood died suddenly from a heart attack.

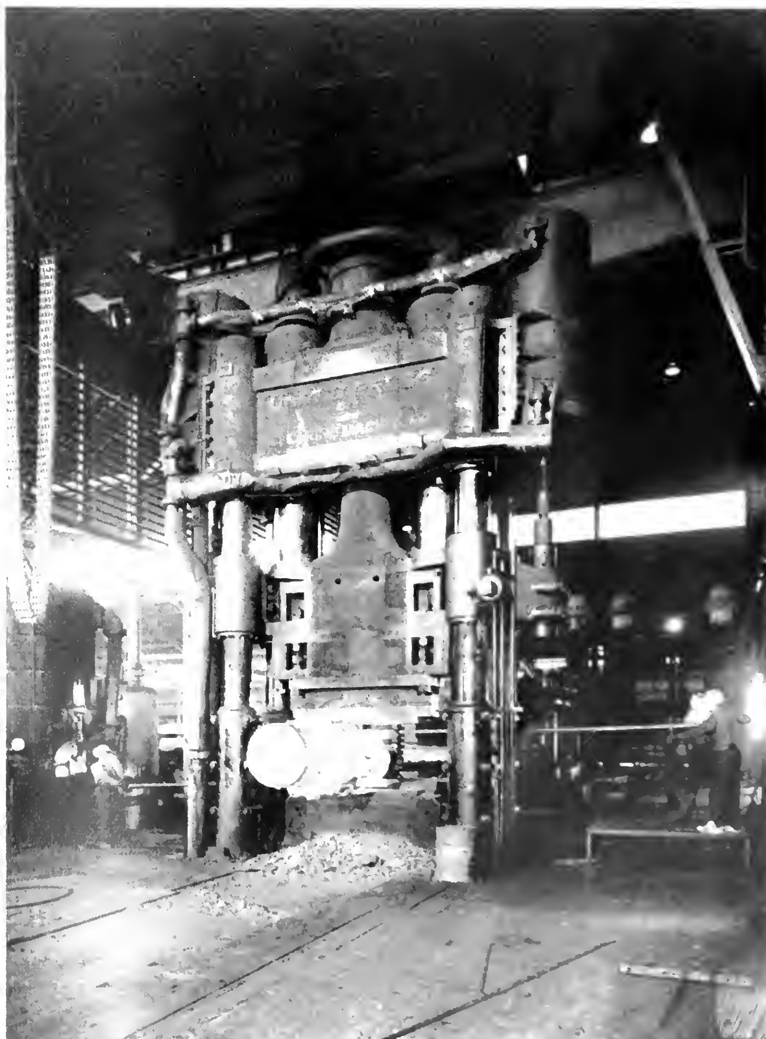
Joseph Eastwood, Jr., succeeded to the presidency and took hold where his father left off. He expanded the business and opened up several new fields, one of which was making grinding balls for Western mines and cement plants.

The company at Tehama Street

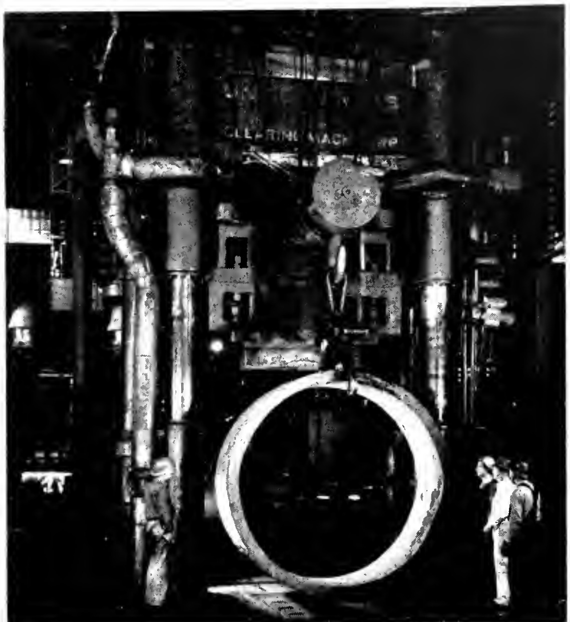
was right in the path of the First Street ramp of the San Francisco-Oakland bridge. The plant had to be moved to a new site, and the new guiding head made sure that the concern would have plenty of room for its modern plant and plenty of room to grow, by acquiring about three and a half acres along the north side of Ashby Avenue in Berkeley, at the junction of that thoroughfare with the Southern Pacific Railway tracks.

In the new set-up a Metallurgical Department was added, second to none in the West. Here constant study by metallurgical experts and engineers is made of grain structure and fiber flow, complete check and control are made on all the plant forging operations, and close study is given to problems involving forgings brought to it by industrials for solution.

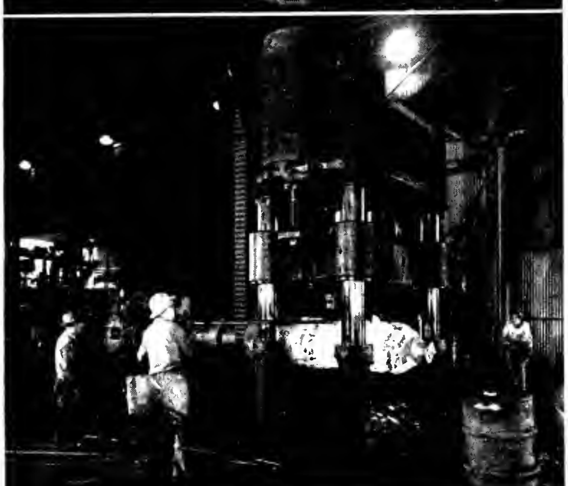
The company set up its new modern enlarged plant just in time for World War II, and so was ready to do its part in fashioning the sinews



3000-ton steam hydraulic press at the plant forging a 30-ton ingot into a driving shaft. This section of the plant is one of the most modern in the country, and its heat-treating equipment is second to none.



Bull gear forged at the plant. It is made of carbon steel, weighs 25,000 lbs. Outside diameter is 117 inches, inside diameter 103 inches, width 44 inches. When machined and gear-cut, it will be installed in a Victory ship.



1250 - ton steam hydraulic press forging a billet into a driving shaft. Note the manipulator holding the billet, driven by the manipulator operator. There are three other men in the crew, each of which has his particular job. The forging tools are laid out in the foreground ready for use.

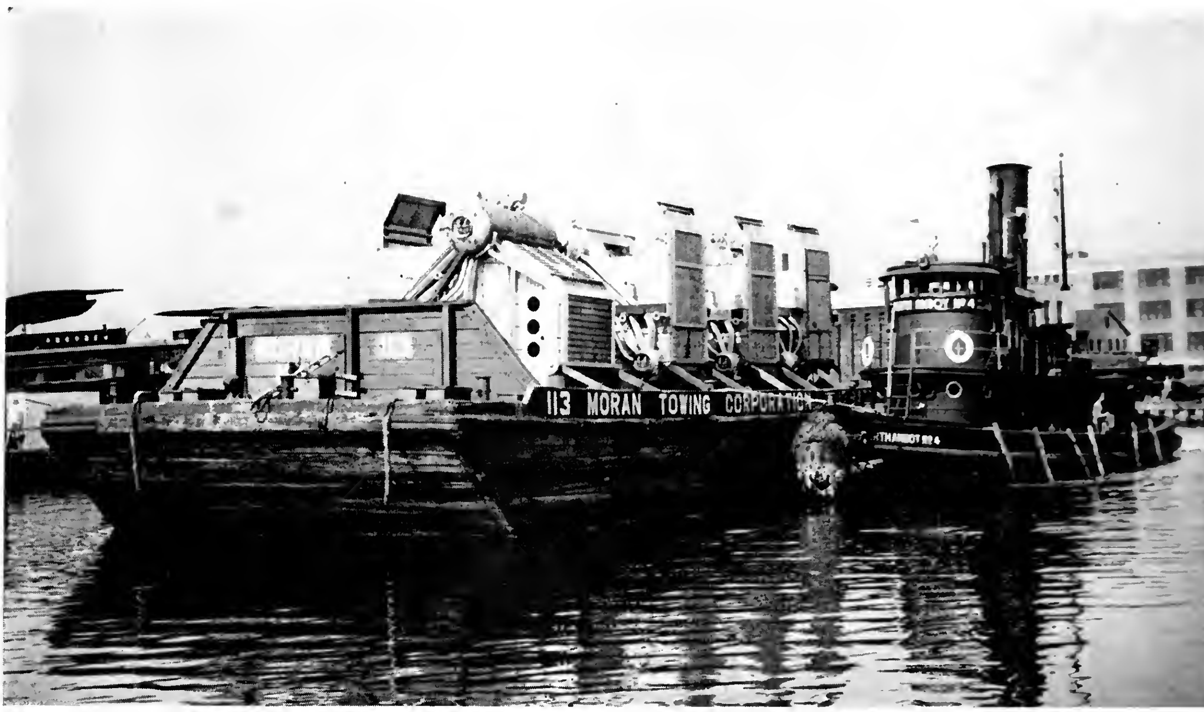
5000-lb. steam hammer forging a round shaft.

of victory. It was not long before all Pacific Coast industries were in tremendous war production.

To make more and larger forgings, the plant was again expanded. The United States Navy built a new unit covering one and a half acres, increasing the ground space to five acres. The new unit was equipped with the largest hydraulic press west of the Mississippi River. Here forgings can be produced up to 150,000 pounds and heat-treated; in fact, modern heat-treating equipment has been installed throughout the entire firm. Every type of forging can be handled in the big plant—press forgings, open hammer forgings and drop forgings. Working night and day, the company is producing forgings for mill rolls, diesel engines, turbines, gears and pinions, marine and industrial shafting, pipe flanges, etc. It has supplied forgings for practically all the diesel engine plants around San Francisco Bay. It makes grinding media of all kinds, such as grinding balls, stamp mill shoes and dies, grinding slugs and mill rods, and produces press forged bars and billets, and drop forgings of innumerable items. The company has many customers for whom it makes forgings to their own specifications.

It is interesting to mention here the close association of the firm and the Pacific States Steel Co. at Niles, California. Joseph Eastwood is also president of this concern. While the American Forge Company buys much of its carbon steel, alloy steel and stainless steel billets from the big steel producers, this connection gives it a dependable source of supply and enables it to work out many special customer problems.

The executive and technical organization includes men who have grown up in the business with the company. Milo G. Spaich, the general manager, entered the concern in the accounting department. John Pihl, one of the oldest employees, is plant superintendent. These men believe in the future of the company. They have the experience, the "know how," and one of the most modern plants on the Pacific Coast. During the war they will carry on night and day. When peace comes, they will be ready for the opportunity which stretches forth its hand to the thriving industries of the West, ready for extension of American business in the promising export field.



First step in the transfer of destroyer building from U. S. Steel's Federal shipyard at Kearny to the company's junior yard at Port Newark—a barge load of high-temperature, high-pressure steam boilers. All destroyer production by Federal now will be centered in the Port Newark yard. This clears the way for the building at Kearny of larger types of ships now needed most by the Navy.

Federal Destroyer Program Shifted

The building of the "pocket cruiser" type of heavy destroyers is being transferred from Kearny to U. S. Steel's Federal shipyard at Port Newark.

"Our junior yard is 'growing up,'" President Lynn H. Korndorff said. Since fabrication of steel for ships began there in July, two years ago, the yard has built Landing Craft, Infantry; Destroyer Escorts and Landing Ships, Medium, as each of these in turn became a No. 1 naval priority. Now, while continuing LSM production, the Port Newark yard gets what is by far its toughest assignment, the construction of the most modern heavy type of destroyers.

Because of the high quality demanded in this work, the speed of such ships and all the machinery and fighting power which must be packed into a slender hull, destroyer construction has been referred to as the "Swiss watch" assignment in naval building.

This is illustrated by the fact that the building of a modern destroyer requires 50 per cent more man-hours than a Destroyer Escort. More shipbuilders will be needed at Port Newark and also at Kearny.

This move is being made to clear the way at Kearny for the building of more big ships, which now have become the No. 1 naval need. A recent Navy Department statement illustrates the new Navy demand now being made by Uncle Sam. In part, it reads:

"First, the Navy needs aircraft carriers and cruisers. The Navy is not now short of these warships. But we need every single additional one that can be turned out **this year and next.**

"Second, the Navy needs new types of assault ships—fast, armed cargo carriers—and transports for future invasions. Here we are behind—in some instances months behind."

At Kearny, Federal builds three of the four types of ships the Navy now needs most; and, in effect, Uncle Sam is telling the yard to "step on it."

These types are large 20,000-ton super-troopships; 10,000-ton "Combat Cargo Ships," which become naval auxiliaries and go right up to the "front lines" of amphibious warfare; and 6000-ton light cruisers of the Atlanta class but of improved design.

All this means a bigger job for both yards, because it involves a tremendous amount of new planning and changes of pace. Federal has kept abreast of war's changes in demand during more than two and half years and will deliver as ordered. But more shipbuilders are needed.

Pacific WORLD TRADE

By T. Douglas MacMullen

THIS TIME, LETS KEEP OUR MERCHANT MARINE LOADED!

John J. Judge
Regional Manager, Bureau of Foreign and Domestic Commerce.

We are taking it as a basic tenet that foreign trade is necessary to the welfare of the shipping industry, and to the manufacturing industry, and to the country as a whole; and also that our readers are in accord on this point. We find such to be the case generally, even to the point of over-enthusiasm.

There are plans under way in a great many industries for the development of an increased volume of exports over the pre-war totals, and those whose business depends on imports are seeking new opportunities for adding to their knowledge of foreign materials and sources. The field for investigations will be very wide.

It is a fact, too, that the world trade departments of Chambers of Commerce, especially in the port cities, are very active in compiling data for their members and in informing themselves in advance on developments in international relations that will have an influence on the future of exporting. In some areas, as in the San Francisco Bay Area, the various Chambers are pooling their industrial lists and their foreign inquiries so that they may more smoothly and efficiently promote the interests of all of their communities. The U. S. Bureau of Foreign and Domestic Commerce is right on its toes awaiting the reopening of world markets.

There are endless thousands of manufacturers in the United States, however, who neither export nor import and who only think of foreign trade, if they think of it at all, as something apart — something exotic and remote that is not for them. These firms should be reached.

No elements in our national life are more concerned with the future of foreign trade than the steamship companies and insurance companies. No groups have closer contacts with shippers, or better opportunities for putting over a selling job. There is a selling job to be done now.

Before the war, the port cities were overrun with solicitors for steamship companies whose major duty seemed to be to plaster shipping rooms with their particular sailing schedules and business cards and whose best days were the days when they could hijack a few tons from a competitive line. There was endless duplication of effort, but the total of constructive accomplishment was small. A mail survey of 150 firms in one of our best years in San Francisco brought 110 replies that the firms were interested in exporting but most of them knew too little of the technique of selling, clearance, credits, exchange and advertising.

With clear sailing ahead for the development of a completely new staff of commercial agents, the steamship companies have the opportunity to do what world trade had needed for a very long time—an intelligent job of selling to the industrial public.

If a selling nucleus could be established in each company's office—possibly consisting of but a single man—and trained to take advantage of the present public awareness, a start in the right direction would be made. The job is to sell industrial managers on the idea of increasing their business by from ten to twenty per cent, **and to see that someone in every firm is trained for it in his own office,** where the general idea will be correlated to the office work as a whole.

This is a tremendous selling and training task, but well worth while. It will cost no more than the old canvassing methods, and each "sale" a man makes will go far beyond the few tons of the present and create business for the future for his own company and for shipping as a whole; for his home port and for the country as a whole.

As the commercial men came home, they would find work awaiting them in a vital sales organization that should not be limited to the shipping point but be spread to every industrial community in the country, and to every buying center in the world market. For too long the industry has catered to just the fringe of the world's land area.

In general, steamship people overlook the interest of certain other groups concerned in shipping, but they should be reached and their cooperation be obtained for selling the general public. Insurance, railroad, truck and air companies are directly concerned with every ship departure. Every vessel carries certain cargo or passengers brought to the port by rail, air, highway or inter-port water carriers.

(Please turn to page 84)

HAWAII: A STATE BY RIGHT OF QUALIFICATION

A WORLD TRADE GEM SEEKS NEW SETTING

Hawaii has been called the capital of the American Sphere of Influence in the Pacific. It is at least the capital.

Hawaii has long been seeking statehood on the basis of its qualifications. It has more than earned that honor.

Long ago in the land of Egypt, there was a chap named Joseph, who well merited a place of equality in his father Jacob's family. His brothers tried to keep the screws on him, however, and it was not until there was a great emergency in the land that they were glad to benefit from the relationship and to know that Joseph had kept himself fit physically and intrinsically so as to be able to stand as a bulwark between them and some very real trouble.

Not too fanciful is this comparison with the young member of our national family out yonder, which, after long-awaited action on old promises, proved to be our Western rampart, absorbing the enemy attack.

Twenty-eight of our states were once territories. With the exception of Arizona and New Mexico, which were territories for 49 and 61 years respectively, no territory was held back from statehood as long as Hawaii has been. The average has been 19 years, with some much less. Alabama, for instance, was given statehood in two years, Nevada in three years, Kansas in six years, and Orleans in seven (remember Orleans? It came in as the State of Louisiana.) Hawaii has been a territory for 46 years.

Hawaii suffered no conquest at our hands. Hawaii was not purchased, as was Alaska. There were no "spoliation" claims as with Louisiana. The lure of Hawaii was not gold, but industry.

Hawaii (Hawaii by the way is not a Polynesian word—it is English—the English spelling of the Polynesian word Owhyhee) became a part of the United States pursuant to a request of the people of Hawaii, expressed through the legislature of their republic and a joint resolution of the United States Congress, approved by President McKinley on July 7, 1898. Before that time Hawaii had been first a group of independent and, in their later years, warring feudal chieftainships, then a united kingdom for nearly 100 years, and for a few years immediately prior to annexation, a republic.

The islands had been settled in the course of centuries by a branch of that widely dispersed people, the Polynesians, who (originating, according to scientific surmise, in Southwestern Asia, and deriving at least in part from the same Aryan ancestry as the European peoples) were driven by pressure of population or other causes to migrate, and eventually occupied many islands in the Pacific. Tradition has preserved the memory of their voyages made in great double canoes, navigated by the stars. Their influence has remained, with traces of their customs, to soften and mellow the conventions and formalities of modern industrial and commercial life.

Some historians hold that Spanish ships visited Hawaii as early as 1555, but the islands were definitely made known to the world in 1778 by the English explorer Captain James Cook (who also opened Australia to white people). European and American contact and settlement which followed—in which an important factor was the New England missionary activity that began in 1820—profoundly affected the entire life and development of the islands.

In Captain Cook's time Kamehameha, a district chief, was rising to power. In a series of campaigns, this Polynesian military genius conquered island after island, and by 1810 had established his sovereignty over the entire main group and founded the kingdom of Hawaii.

In 1893, as a result of political differences and the pressure of economic changes, the monarchy was overthrown and a republic formed, which continued until annexation of the island by the United States in 1898.

A major fear on the part of many of the people of Hawaii, as well as mainland people, has been that the Japanese population of the Islands would reach a position of domination because of their disproportionate birthrate. Overlooked is the fact that Japanese, or those of any other race born in Hawaii, are American citi-

Honolulu harbor shows ships from all over the Pacific anchored at America's mid-ocean port. At left the U. S. A. T. Republic. Next, from left to right, Matson liner Lurline, Canadian Empress of Japan, Dollar Line's President Hoover, U. S. A. T. St. Mihiel and the Japanese liner Taiyo Maru.

Pacific World Trade

zens, and in the case of the 155,000 Japanese in 1939, 119,000 were citizens, and Congressional delegate Farrington states that these citizens of Japanese ancestry have behaved no differently than those of any other ancestry in the Islands. Their war record in the American army in Europe and in the South Pacific is all that could be desired.

Furthermore, the birthrate among the Japanese is no longer disproportionate, and now follows the pattern of other races. The percentage of Japanese in the total population is declining.

Imports and Exports

Hawaii depends on the Mainland for a market for its products. In a total of $115,000,000, $113,000,000 in Hawaiian products was shipped to the Mainland. Imports to Hawaii totaled $102,000,000 from the Mainland in a total of $109,000,000.

Nearly 95 per cent of Hawaii's export is sugar and pineapple in nearly equal proportions. The sugar volume is usually 2 or 3 per cent above the pineapple. Of minor importance are about 25 products, including wool, hides, bananas, coffee, nuts, molasses, paper and fish.

Federal Taxes

The cost to the United States Government for the operation of the territorial government is very small in comparison with the income received. The salaries of judge's and governor's staff are the principal items of cost. Against these, the territory produced in Federal taxes in 1939 a total of nearly $12,000,000. This was more than that paid by a great many of the states. North Dakota, for instance, produced only about one-eighth as much, New Mexico about one-quarter, Montana about one-half, Utah about three-quarters. Fourteen states fell below Hawaii in 1939.

The Argument For Statehood

The proponents of statehood maintain:

That Hawaii was an independent nation for practically 100 years prior to annexation.

Joseph R. Farrington
Delegate to Congress from Hawaii.

That Hawaii was not a new land, occupied and settled by American immigrants, nor was it acquired by conquest nor purchase.

That annexation was by voluntary action of the people and government of Hawaii; and was the consummation of the desire of the two contracting governments for a closer alliance, expressed over nearly 50 years of negotiations.

That the history of those negotiations caused the Hawaiian people to believe that their place in the Union would follow the traditional course leading to statehood.

That though annexation was by joint resolution of Congress, the latter's reference to the then pending treaty of annexation, and its own phaseology, confirmed this belief.

That the prompt organization of Hawaii as an incorporated territory of the United States completed the purpose of annexation in accordance with the intent of both governments which were parties thereto.

That such a government has always heretofore been a prelude to admission as a State.

That the joint resolution of annexation extended American citizenship to all the citizens of the former Republic of Hawaii; and the people of Hawaii have since enjoyed all of the rights and privileges, and accepted without exception all of the duties and obligations, of American citizenship.

That Hawaii has consistently paid into the Federal Treasury its share of the cost of the National Government.

That Hawaii has fulfilled every requirement for statehood heretofore exacted of Territories.

That whatever the racial complexion of Hawaii may be was in fact already existent at the time of annexation and can hardly now be raised against its people.

That Hawaii's devotion to democratic principles, the patriotism and loyalty of its people, and the high development of its resources entitle it

Bishop Street, Honolulu.

to a sympathetic consideration of its plea for statehood.

The Argument Against Statehood

A Congressional Committee which made an extended study in 1938 recommended that statehood be delayed for several rather surprising reasons. The first of these seems to be that the people are happy as they are. Another is that the people of the Islands do not indicate "complete unity" on the question. A third reason was that the admission of Hawaii as a state would be a departure in that it would be the first non-contiguous area to be admitted.

Answers To the Above

Some people attach significance to the fact that the first set of statistics sought, or rather the first included in the report to Congress, was on how many Republicans and Democrats there were in the voting population. The vote for the territorial legislature has been overwhelmingly Republican from the beginning, and the representation in the two houses of the legislature has followed this pattern. There have been occasions in both houses when there were no Democrats at all. Regardless of the political leanings of a Congressional Committee, the people of the Islands are entitled to have their Congressional delegates in both Houses of Congress and that they should be permitted a vote. Also, the citizens of Hawaii are entitled to vote for the United States President.

Duke Kahanamoku
Honolulu's famous swimmer-sheriff.

The committee's suggestion that complete unity be reached, hardly coincides with the American principle of majority rule. The committee further indicated, however, that a "substantial majority" should rule. Why a substantial majority, they did not say. However, in November, 1940, a plebiscite was held throughout the territory. The vote: for statehood, 45,344; against, 22,240.

The other major objection — the non-contiguous nature of the area—was not raised in the promises given the territory in 1898 when the people asked for admission to the union as a state but were given "temporary" territorial status. They are no more non-contiguous now than they were then. Hawaii has qualified in every way for statehood. There is no reason why it should be subjected to control by appointment from Washington any more than the states should be, nor should the Department of Interior be involved in its affairs.

It is to the interest of the shipping world that Hawaii be able to develop unhampered its business in any direction it chooses.

The only throne room in the United States, Honolulu.

A Post-War Congress of Trade, Industry, Engineering & Finance

An exploratory committee of some of the leading engineering figures in the United States is looking into the expansion of trade to Pacific Ocean countries. Since the product of engineering is construction, and since construction results in the mushrooming of trade in multitudious directions, the proposal of the committee is for a widespread engineering survey of the Pacific area. It is proposed that reports be prepared for submission to what they designate as a "Post-war Congress of Trade, Industry, Engineering and Finance" for the development of the lands of the Pacific basin, scheduled to be held in San Francisco in 1946. Already expected to participate are the national organizations of Bankers, Chemists, Foundrymen, Electrical Engineers, Mining and Metallurgical Engineers, Road-builders, Civil Engineers, Mechanical Engineers, Safety Engineers, Sanitary Engineers, Electrical Manufacturers, Foreign Trade Council, Purchasing Agents, and many others. The committee is announced as including the following: H. S. Simpson, past president, American Foundrymens' Association; C. E. Hoyt, exhibit manager, American Foundrymens' Association; George T. Seabury, secretary, American Society Civil Engineers; F. H Fowler, past president, American Society Civil Engineers; William H. Eisenman, sec

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Pacific World Trade

Post-War Trade With British Empire

CHANGED CONDITIONS REQUIRE STUDY

Godfrey Fisher
H. M. Consul General at San Francisco.

From 1919 to the outbreak of the present world conflict the British Empire was the most important foreign market for the produce and manufactures of the United States. American business in general is interested in the possibilities of this important market in the post-war period. The development or maintenance of the United States export trade with the British Empire depends on a great many factors, among which are the Imperial preferential tariff system, the extent of industrialization within the various parts of the Empire, and the extent of protection afforded against foreign imports, the supply of dollars, and the liquidation of wartime controls.

What is said in the above paragraph about exports may be said to apply to imports as well, but with certain added complications. One of these is the uncertainty regarding the competitive position of synthetic rubber, the extent of the "scorched earth" effects in the East Indies, the need for metals and coal in the British Isles, and the development of alternative sources of supply for many items formerly bought in British territories.

Another uncertainty with a very large question mark is the post-war size and effectiveness of the British Merchant Marine. A large part of the dollars accumulated by Britain for purchases in the United States was accumulated through the earnings of British ships in the hauling of both freight and passengers to world-wide ports, including American ports.

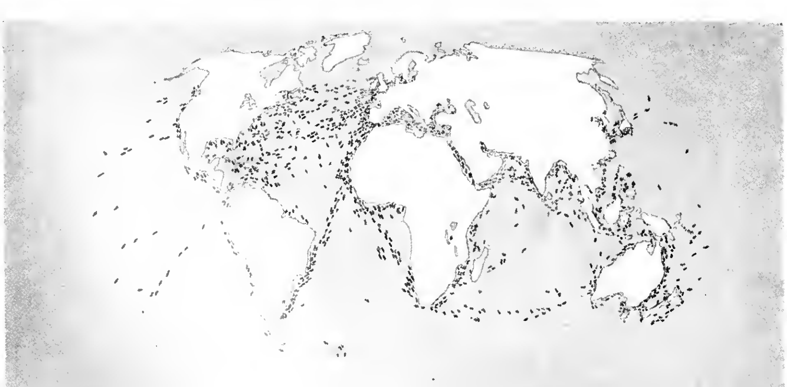
In connection with shipping, there is also the question of marine insurance. Until the British Merchant Marine is restored to its former competitive position, it is probable that the amount of marine insurance premiums credited to British companies will be less than they formerly were.

The above just suggests the uncertainties that are involved. There are many others, such as the price to be paid for newly mined gold, the extent to which capital investments will be made in either country by nationals of the other; and, of course, of greatest importance for the immediate future will be the mechanism of the international bank and its lending policy; our tariffs, the British Empire preference system, and the flexibility of the Sterling balances held in London to the credit of Empire units. These credits totaled, as of the last date of computation, as follows:

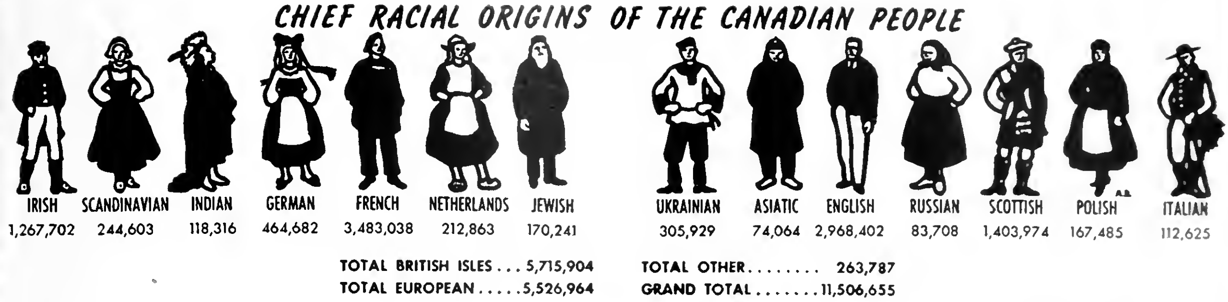
India	752,000,000 pounds
Eire	144,000,000 pounds
Malaya	100,000,000 pounds
Australia	96,000,000 pounds
New Zealand	40,000,000 pounds
Egypt	195,000,000 pounds
South Africa	21,000,000 pounds
Colonial	70,000,000 pounds

The British are going to need all of the exchange they can accumulate and probably all they can borrow as well. The distribution of balances of Empire exchange is controlled in London, so it is of importance in prospective dealings with Empire units to know that they may not always be free to buy or sell without restriction. On the other hand, we have through two major activities caused a demand to be developed in Empire countries for American goods, and such goods will no doubt be purchased directly or indirectly. One of these agencies is the armed services, now numbering millions of men and women, who have spread the names of American products pretty much

SEA SPACES OF THE WORLD



Black symbols represent the position of all British ships at sea on a typical day of peace, and indicate the sea lanes along which trade flows, linking producers with manufacturers and nation with nation. The sea can thus be seen as joining, not separating the land masses.

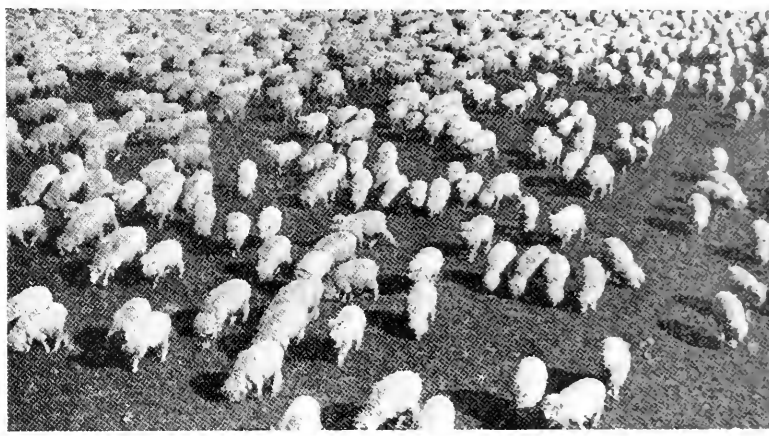


all over the world. The effect of this is hard to calculate, but it will be enormous.

The second agency referred to is lend-lease. Through lend-lease we have directly introduced American products to other countries, and the effect of such introduction is sure to be long-lasting. When it is borne in mind that sources of supplies that have been violently competitive with American sources will probably be closed to the world for a long time, the happy coincidence of American materials on the spot cannot fail to be beneficial.

Before mentioning territories and before getting down to brass tacks on possibilities in individual units of the Empire, it is important to know how the Empire is composed. The word Dominion is going out of popular use, although it is a part of the official name of Canada and New Zealand. Australia is called a Commonwealth, South Africa a Union. These four, with Eire, are the British "Dominions." Churchill refers to them all as parts of the British Commonwealth of Nations, or the "Commonwealth and Empire."

Generally speaking, the British Commonwealth and Empire may be referred to as in three classifications. First there is the United Kingdom, Canada, Australia, New Zealand, South Africa and Eire. Second there is India, and third there is the Colonial Empire. There will be some changes, of course, after the war. India will probably become a Dominion and be classed with Canada and the others. Many of the colonies will be reshuffled, and there may be some new ones. All of them will have had their ties with the Empire either strengthened or weakened. Loosely binding them all together is loyalty to the Crown. In exchange for loyalty, they are entitled to protection, and most of the Colonies are expensive luxuries.



Some of Australia's 124,000,000 sheep, from which comes one-fourth of world's fine wool.

The blacked-in sections of the above map are British India; the white areas are Indian States. The latter represent a population of 93,189,000, owing allegiance only to their Indian rulers who are in treaty relations with the British Crown. Each ruler controls all the internal affairs of his State but does not deal with external affairs.

Pacific WORLD TRADE

Lend-Lease

Various units of the Empire have been aided by lend-lease shipments, and the United States has been aided (apart from direct payment and reverse lend-lease) by having its products introduced on a very broad scale into many countries in which they had been previously unknown.

Into India, for instance, have been introduced many varieties of canned food in enormous quantities. Also surgical instruments and appliances, motorcycles and parts, rayon piece goods, aviation gasoline, barbed wire, concrete mixers. Very few private trade connections previously existed for these lines.

To South Africa has gone steel plate and sheet, tin plate, tools, and metal-working machinery.

To Australia have gone motorcycles, safety razor blades, barbed wire, rubber hose, cotton and canvas articles.

To New Zealand have gone waterproofed garments, paper-base stocks and motorcycles.

To the United Kingdom have gone wide varieties of food products, tires and tubes, seeds, starch, wall board, synthetic rubber, calcium carbide and phosphate rock.

And so it goes. There are British colonies in Africa, South America, Asia, Europe and North America, as well as the islands of the seas. If you make diesel engines or steel rope or machine tools or surgical appliances you will find that they, or similar articles, have been introduced through lend-lease to Ceylon, and you would do well to check the lend-lease lists and lay plans for reaching that post-war market. If you make barbed wire, you will find that it has been introduced to the African Gold Coast. You will find a ready-made market for American steel plate, tools and machinery in Nigeria.

The fact of overall complications mentioned in the earlier paragraphs above may never affect your particular business. It may help it. Probably each article and each territory will find conditions peculiar to itself with few of them permanently insurmountable.

We will have more to say on this subject and in more specific detail in subsequent articles. Sufficient to say here that there is almost no article of American manufacture that will not be welcomed on some parts of the globe for many years to come. You can find your markets if you will seek them out.

(Continuation of page 78)

This latter selling job may be one for the clubrooms—for top men in each company. If the job is done right, there will be more business for everyone and the volume of world trade will grow.

And it should not be overlooked by the men on the selling front that ships come back as well as go out, and it is just as important that they be familiar with opportunities for expanding the import market as the export.

Wellington Horbor.

(Continuation of page 81)

retary, American Society for Metals; Warren H. McBryde, past president, American Society of Mechanical Engineers; F. H. Letchfield, chairman, 1946 Convention, American Society of Mechanical Engineers; Charles M. Upham, director, American Road Builders Association.

The general plan for the Congress is to have fully documented propositions submitted by various countries or political subdivisions thereof, and the Congress will proceed to investigate and recommend for action a wide variety of projects. Invited to the Congress will be cnotracting agents of the localities affected, and steps will be got underway for the financing and contracting of such proposals as are approved. In the preliminary stages, invitations will be sent throughout the Pacific area for the submission of construction projects such as highways, bridges, hospitals, schools, railroads, power lines, or any other job that requires more than local engineering, banking and constructing abilities. Engineering investigations will be made by visiting delegations, and it is on their recommendations that the Congress will act.

That there is need for professional services abroad is to some extent indicated by the program of Chiang Kai-shek in China, which calls for 100,000 miles of railroad, 1,000,000 miles of highways, 20,000,000 kilowatts of power plant equipment, millions of telephones an dthousands of factories, and an interesting item which he includes is 12,000 electrical engineers, 41,900 mechanical engineers, 110,000 civil engineers, 25,000 architects and 230,000 doctors.

The plans of the Committee have reached the stage where Congressional action is about to be asked.

The world is learning that wealth is not created by taking from others but by increasing the use of productive equipment.

Wm. E. Knox, of Westinghouse.

Pacific WORLD TRADE

Progress in China

INDUSTRIAL EXHIBIT IN CHUNGKING

Under the sponsorship of the National Resources Commission, an industrial and mineral products exhibition was held recently in Chungking, China.

More than 10,000 exhibits prepared by over 100 industrial, mining and engineering enterprises, and including geological specimens, working and still models of factories, raw materials, semi-finished and finished products, as well as photographs and charts, were displayed.

The exhibition, which was planned for a two-weeks' display, was continued for an additional week in order that all those desiring admission might be accommodated.

In this connection, a report just released by the Minister of Education, Chen Li-Fu, includes figures showing the popularity of courses in Chinese Universities. Heading the list is engineering.

Top, right: Camel caravan in Peking. Center: Old-type machine shop in China. Below: Operating exhibit in recent industrial exposition in Chungking.

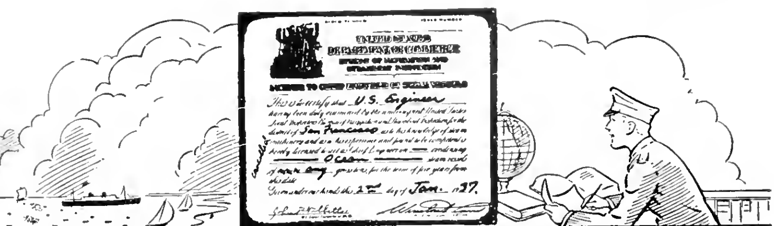
AMERICAN-BUILT SMALL CRAFT PROVING VALUE TO ALLIES

The tremendous production program that has played so vital a part in the successful prosecution of the war by our armed forces on every global front has also been of invaluable aid to our allies, points out Ira Hand, secretary of the National Association of Engine and Boat Manufacturers. Referring to the President's fifteenth report to Congress on lend-lease operations, Mr. Hand notes that more than 390 millions of dollars worth of water craft have been sent overseas since March, 1941.

The United Kingdom and Russia have been the principal beneficiaries from the flood of landing barges, P. T. boats and other fighting craft small enough to be shipped aboard cargo vessels. Government figures show that the United Kingdom receeived water craft valued at $185,391,000, and the Soviet Union $119,813,000 worth of fighting craft. India, China, Australia, New Zealand, Africa, the Middle East, the Mediterranean, Latin-America and other peoples have had an opportunity to gage the worth of these small American built boats.

A table showing the export of water craft since March, 1941, follows:

United Kingdom	$185,391,000
Soviet Union	119,813,000
India and China	25,062,000
Australia and New Zealand	5,094,000
Africa, Middle East, Mediterranean	37,231,000
Latin America	758,[illegible]
All others	19,052
	$392,4[illegible]



Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco 11, California

Steering Mechanisms

II—STEERING GEAR (Continued)

A practical workable design, as used by the Waterbury Tool Co., is shown in Fig. 3. Shown here is only the rotating part. Wheel A is at the left. Built into it are 6 or 8, perhaps more, cylinders with suction and/or discharge port at the left end of the cylinder. Wheel B is at the right. The pistons, in the cylinders of wheel A, are connected on connecting rods and ball joints to wheel B.

The shaft of wheel B is carried on a ball bearing at the left, and a universal joint at the right within (not shown) wheel B. This universal joint connects to the shaft of wheel B at the right.

The pressure tends to separate these two wheels. Therefore thrust to the left by wheel A is resisted by pressing against a smooth plate which carries ports lining up with the holes in the several cylinders at the proper time in their rotation about the center. Thrust of wheel B to the right is resisted by a roller thrust bearing with rollers riding against the thrust plate, now rotating as shown in Fig. 3. This thrust plate is called the tilting box.

When this thrust plate or tilting box is moved so that its plane is at other than right angles to the shaft, then wheel B is caused to move in such a way that the pistons are forced into and out of the cylinders. This angle position of wheel B is shown in Fig. 4. It should be noted that the parts in Fig. 4 are rotating, driven by a motor at the right. Rotating, and at the same time following the angle of the thrust or tilting box, causes the wobble motion of wheel B necessary to operate the pistons. In fact, this or a similar pump has been referred to as a "wobble pump."

If we now assemble wheels A and B and the tilting box into a casing, and show them in cross section, we have Fig. 6.

Of interest to note are: A motor is coupled to shaft 7, driving it at constant speed. This rotates wheel B, called socket ring, No. 42, through the universal joint, so that this socket ring may tilt or wobble with respect to the shaft. This socket ring is supported and guided by radial thrust roller bearing 46, and thrust roller bearing 48.

The pistons, one shown at 37 in cross section, are moved by connecting rod 41.

The rotating cylinder barrel 33 (wheel A) is centered and driven from the shaft by the keys 35. It is also pressed against the valve port plate by spring 36, and by the hydraulic pressure.

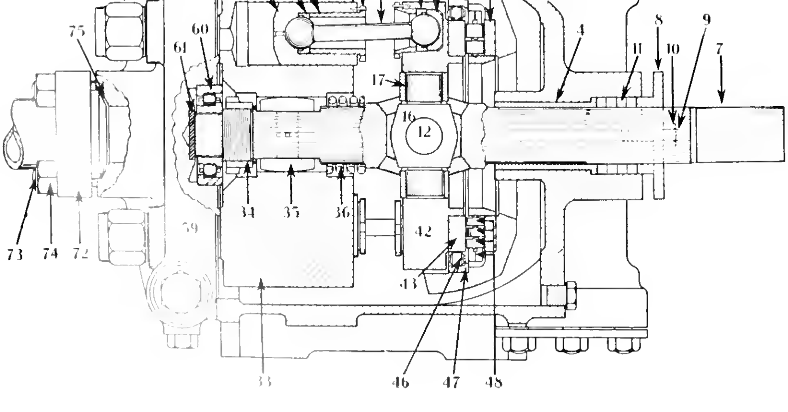
Leakage oil from the cylinders fills the space around the rotating element, hence this entire casing is oil-tight, with a packing gland 8. The pressure in this space will be that of the suction side or of the entire system when not pumping. It may be necessary to locate copper water cooling coils in this space to cool the oil in the larger sizes.

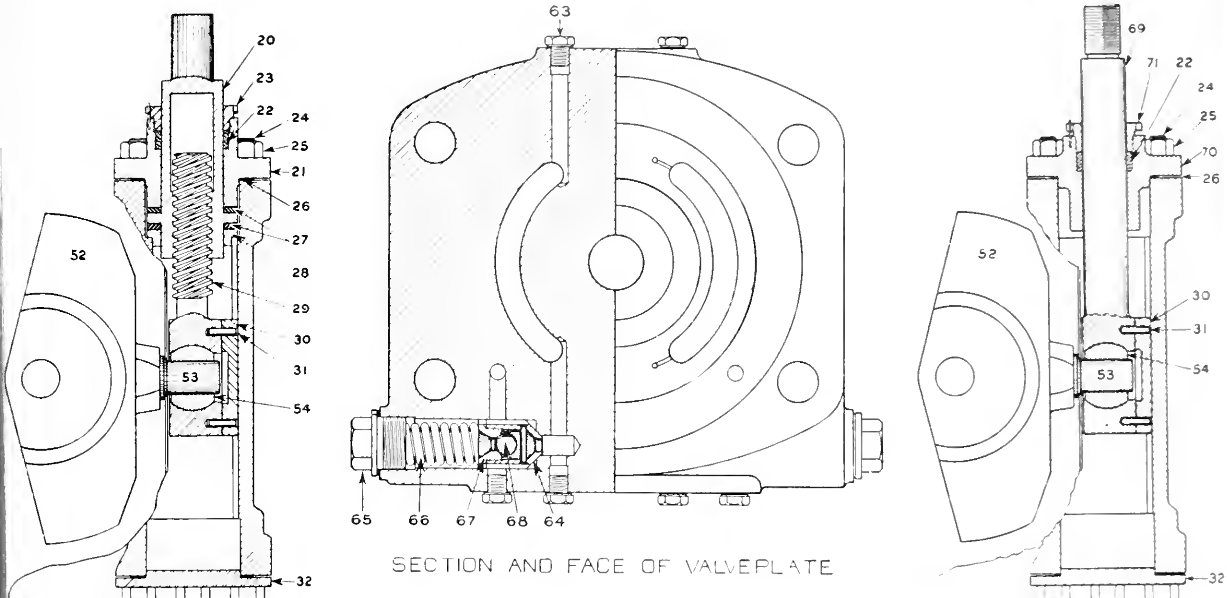
The tilt box is moved from a plane normal to the shafted (at right angles) to an angular position by the tilt control, Fig. 7. Stud 53 is caused to move up or down, which tilts the

VERTICAL SECTION OF PUMP WITH SLIDING CONTROL

1, Case; 3, Cast Bolt Nut; 4, Case Bearing Bushing; 7, Main Shaft; 8, Main Shaft Gland; 9, Main Shaft Gland Stud; 10, Main Shaft Gland Stud Nut; 11, Main Shaft Packing; 12, Main Shaft Pin; 16, Main Shaft Trunnion Block; 17, Main Shaft Trunnion Block Bearing; 20, Control Nut; 21, Control Nut Bearing; 22, Control Nut Packing; 23, Control Nut Packing Gland; 24, Control Nut Bearing Stud; 25, Control Nut Bearing Stud Nut; 26, Control Nut Bearing Washer; 27, Control Thrust Ring; 28, Control Shaft Hanger; 29, Control Shaft—Rotary; 30, Control Shaft Key; 31, Control Shaft Key Pin; 32, Control Housing Plug; 33, Cylinder Barrel; 34, Cylinder Barrel Nut; 35, Cylinder Barrel Key; 36, Cylinder Barrel Spring; 37, Piston; 38, Piston Bushing Cap Nut; 39, Piston Bushing Cap Nut Lock; 40, Connecting Rod End Bushing; 41, Connecting Rod; 42, Socket Ring; 43, Socket Ring Thrust Race; 44, Ring Socket; 45, Ring Socket Bushing Nut; 46, Radial Thrust Roller Bearing; 47, Radial Thrust Race; 48, Thrust Roller Bearing; 49, Box Thrust Race; 52, Tilting Box; 53, Tilting Box Stud; 54, Tilting Box Stud Bushing; 59, Valveplate; 60, Valveplate Roller Bearing; 61, Intershaft Disc; 62, Oil Expansion Box Hole Plug; 63, Air and Gauge Plug; 64, Relief Valve; 65, Relief Valve Cap; 66, Relief Valve Spring; 67, Replenishing Valve Seat; 68, Replenishing Valve Ball; 69, Control Shaft—Sliding; 70, Control Shaft Bearing; 71, Control Shaft Packing Gland; 72, Pipe Flange; 73, Pipe Flange Stud; 74, Pipe Flange Stud Nut; 75, Pipe Flange Gasket.

Fig. 6





ROTARY CONTROL

SECTION AND FACE OF VALVEPLATE

Fig. 7

SLIDING CONTROL

box about a horizontal axis at right angles to the shaft. This tilting action can be controlled by a rotary motion of a shaft, as shown in Fig. 7 at the left, or by a straight up and down push-pull motion of a rod, as shown in Fig. 7 at the right. Details of these two motions are clear from the figure.

The valve plate or face plate, or valve port plate, is shown in the center of Fig. 7 in half-section. The kidney-shaped port is in alignment with the ports in the ends of the cylinders. As these rotating cylinders go over at top or at bottom, the piston is either at one end or the other of its stroke, depending on whether the tilt box is tilted forward or backward. In this position there is no change of displacement of the piston, and the cylinder port is covered up, making no connection to the valve plate ports. But as the cylinder travels toward the half-way point between top and bottom, the piston displaces suction or discharge, depending on tilt, and the cylinder port communicates with the valve plate port as it moves to the near end of the stroke. Either valve plate port may be suction or discharge, depending on tilt of the tilt box.

The air vent plug 63 and relief valve 64 are shown in section in Fig. 7. This same relief valve is needed for both ports, as either may be under pressure.

The effort required to move the tilt box increases with the angle of tilt and with the back pressure against which the pump must deliver fluid. But maximum pressures are used only at minimum flow or tilt angle, or the increased angle of tilt corresponds to the minimum pressures.

The application of this variable stroke pump may be entirely different for different uses. For instance, in steering, these pressures are delivered to hydraulic rams. Or for turret turning or gun elevating, the pressure may be used to drive a hydraulic

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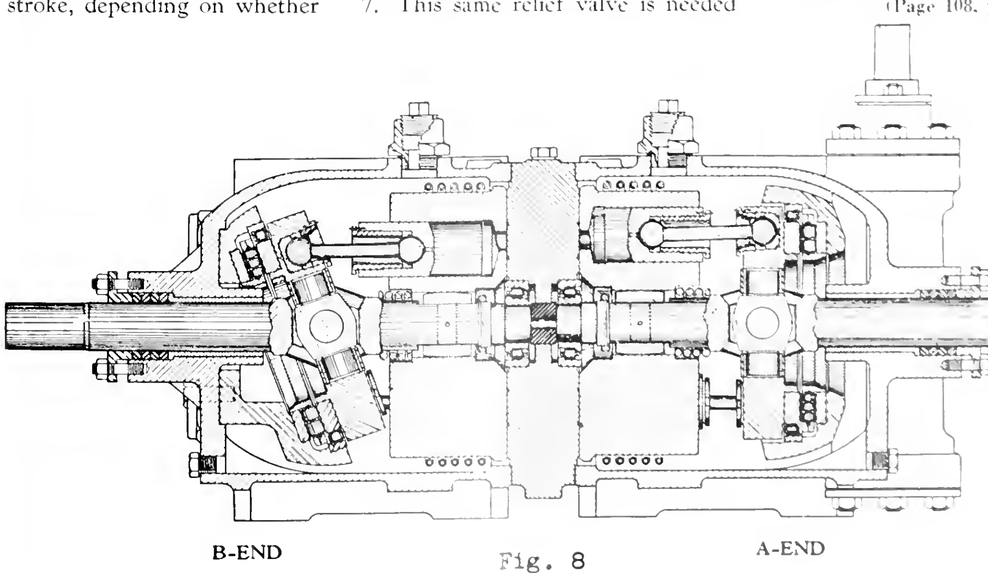


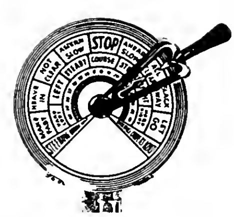
B-END

Fig. 8

A-END

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

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Hints for Security and General Inspections

Deck officers at sea are responsible for inspection and maintenance of all equipment having to do with safety of life aboard ship and in any emergency abandonment of the ship. It is highly important, therefore, that deck officers understand this equipment and its functioning. Herewith we reproduce a skeleton outline of safety precautions as given in the current issue of "The Proceedings of the Merchant Marine Council, U. S. Coast Guard."

General Safety Precautions

Hatches.—Examine tarpaulins, secure battens and wedges and maintain watertightness.

Watertight doors.—Keep securely closed and dogged when openings are not in use for passage.

Weather doors. — Keep securely closed except when being used for entrance or exit.

Airports. — Examine gaskets and secure tightly with "dogs" when conditions of wind and sea so demand. See that deadlights fit properly and keep at hand ready for use.

Deck cargo.—Examine all lashings and chocks for security.

Fire-Fighting Equipment

Fire hose. — Examine frequently for defects. See that the holder clamps or pins in rack are free. If enclosed in cabinets, see that door latch can be readily opened. See that gaskets fit in good order for connection and that nozzles and spanners are in place.

Fire extinguishing system. — Examine all control valves and see that they are in good order and ready for immediate use. Do not operate valves.

Portable fire extinguishers. — See that they are properly filled and secured in place where they can be readily removed for use.

Fire axes.—See that they are kept in place and handy for use. See that handles fit snugly to heads and that cutting edge is smooth.

Air and gas masks.—Examine for condition and see that they are readily available for use.

Emergency Steering Gear

Test out frequently and have necessary tools handy to throw in gear quickly if needed.

Blackout Precautions

Observe rigidly. Eliminate all light reflections; also noise, such as ringing of bells or blowing down of boilers. Do not smoke on deck or show any light at night.

Lifeboats

Check all equipment frequently when at sea. Examine thoroughly when in port.

See that oars, boathooks, radio mast, etc., are in order and properly lashed.

See that rowlocks are properly secured, ready for shipping in sockets.

See that rudder fits properly and is attached to boat with lanyard.

Examine all sails and attached gear. Dry and set sails occasionally for training.

Examine bulk drinking water and provision containers frequently.

See that boat painters are properly attached and led out and are not chafed.

If boats are carried swung out, see that the forward and after guys from the davit heads are kept taut.

See that frapping lines are provided for lifeboat falls in case they are needed.

See that riding puddings are properly placed immediately under the gunwale, and in way of a thwart.

See that a hammer or bar is provided to release the pelican hook on the griping-in bridles.

If boats are carried inboard, see that the gripes are secured and falls moderately taut; see that crank handles are attached in place.

Drain any water out of the boats and see that plugs are secure.

Note that the lifeboat fall reels are clear for running.

Always leave a little slack on the span between the davit heads to which the life lines are attached; otherwise, damage may be sustained if both davits are not cranked out at equal speed.

Operate motorboat engines frequently.

Operate and lubricate hand-propelling gear frequently.

See that there is no stowage of stores or any other gear on boat deck in way of lifeboats.

See that the turns of the falls are properly placed on the lowering bitts.

See that the embarkation nets are properly secured and stowed ready for dropping promptly into position.

Where required, see that embarkation ladders are properly placed and readily available for use.

If vessel is loaded, shorten life lines and net so that there will not be too much dragging in the water when released. They are liable to become entangled and capsize the boat if vessel is rolling or a heavy sea is running.

Life Rafts

See that they are carried high enough on skids to properly engage the securing clips at upper end.

See that releasing plate at base is in free working order and all the assembly in good condition.

Note that painter is coiled clear for running and is not chafing.

Examine all water lights and be assured they will ignite and that they are secured so that they will fall free of the vessel when rafts are launched.

Examine all water and provision containers carefully.

Check all other equipment.

Life Floats

See that this equipment is stowed so that it will float free and can be readily launched overboard.

Note that the water lights are properly attached and will ignite.

See that the water lights on ring buoys are properly attached and will ignite.

Life Preservers

See that they are at hand, in good condition and ready for each individual's immediate use.

See that additional life preservers in boxes are kept in good condition and that they can float out of the boxes.

Life Preserver Suits

See that each seaman pays particular attention to keeping his suit stowed in the proper manner and keeps it in good order so it can be donned quickly.

Lights

Examine all portable emergency lights. See that they are kept in their respective positions and will ignite.

See that all stationary emergency lights will ignite.

Test all emergency flashlights.

Have each seaman take care of his life preserver light and see that it will ignite, and renew batteries in all these lights as required.

Miscellaneous

Abandon ship kits.—See that they are kept handy for placing in lifeboats.

Portable radio transmitter.—Keep handy for placing in lifeboats, with lanyard for lowering if needed.

Whistles.—Keep in good order—every man to take care of his own.

Jackknives.—See that blades are clean and hinges oiled. Every man should carry his own, or keep close at hand.

Luminous tape markings. — See that this tape is effectively and properly maintained.

Emergency escapes.—See that they are kept free and clear of all obstructions. See that emergency ladders are kept in place and properly secured.

Additional clothing.—Always keep additional clothing at hand, whether vessel is in cold or warm latitudes.

Checking sheets. — Obtain copies of Equipment Checking Sheets for Boats and Rafts as contained in Wartime Safety Measures

A Makeshift Still for Drinking Water

Initiative, ingenuity and coolness in dire circumstances are admirable traits, and any person displaying these traits is worthy of praise and encouragement. A splendid example of such an individual came to light in a recent case reported to U. S. Coast Guard Headquarters, and the story is certainly worth repeating at this time.

As an American freighter was making its way through the waters of a distant ocean it was torpedoed by an enemy submarine. The crew abandoned ship, and while floating around in lifeboats and rafts were subjected to machine gun fire from a U-boat, which later proved to be Japanese. Many of the lifeboats were broken up and their water tanks punctured by the time the sub ceased firing and departed. Several members of the crew righted a capsized lifeboat and began picking up other survivors. At last 39 men were assembled on 1 lifeboat and 2 rafts, and the long hopeful wait for a rescue ship began. The food was rationed at an amount sufficient for all the men for 15 days. The water supply, however, was low, since so many of the water tanks had been punctured by machine gun bullets.

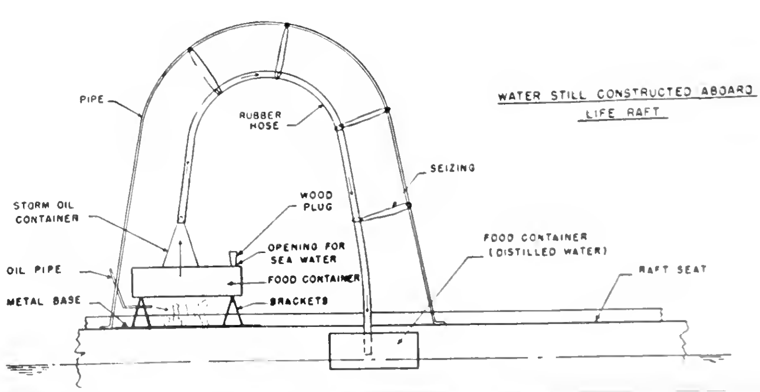
A few days after the sinking, the junior engineer proceeded with the aid of some of the other men to build a makeshift still. With various nondescript pieces of equipment taken from the lifeboat and rafts, a distilling plant was constructed which produced approximately 60 gallons of potable water in a period of 48 hours. Except for this makeshift still it is doubtful if any members of this crew would have survived the 16 days afloat under the blistering sun. As it turned out, all were saved, with the exception of one man who died from injuries sustained when the vessel was torpedoed.

At first glance the construction of such a still for the making of potable water would appear complicated, requiring intricate parts which must have been salvaged from the sinking vessel. That is not the case, however. This junior engineer used only such equipment as is usually found in lifeboats.

These parts are all named in the sketch herewith, which shows the entire construction of the still. Note that: the condenser was secured at the center of the raft so that it was partly submerged in sea water, the latter being used as the condensing medium. For fuel, the second raft was broken up into kindling wood to feed the fire beneath the evaporator. Naturally, the wood was wet, but by the use of the storm oil a fire was maintained.

Present-day lifeboats and rafts are so well equipped that with the use of initiative and ingenuity it is possible to do wonders with the various items aboard, as was illustrated in this case.

(Abstract from U. S. Coast Guard Bulletin.)



A Solution

Captain Paul F. Lee of the Bureau of Ships, Navy Department, Washington, D. C. (right), discusses the new composite hob with Lt. A. J. Kraag (left), who was in charge of its development, and Capt. E. D. Almy, assistant general manager of the Joshua Hendy Iron Works, who aided in the project.

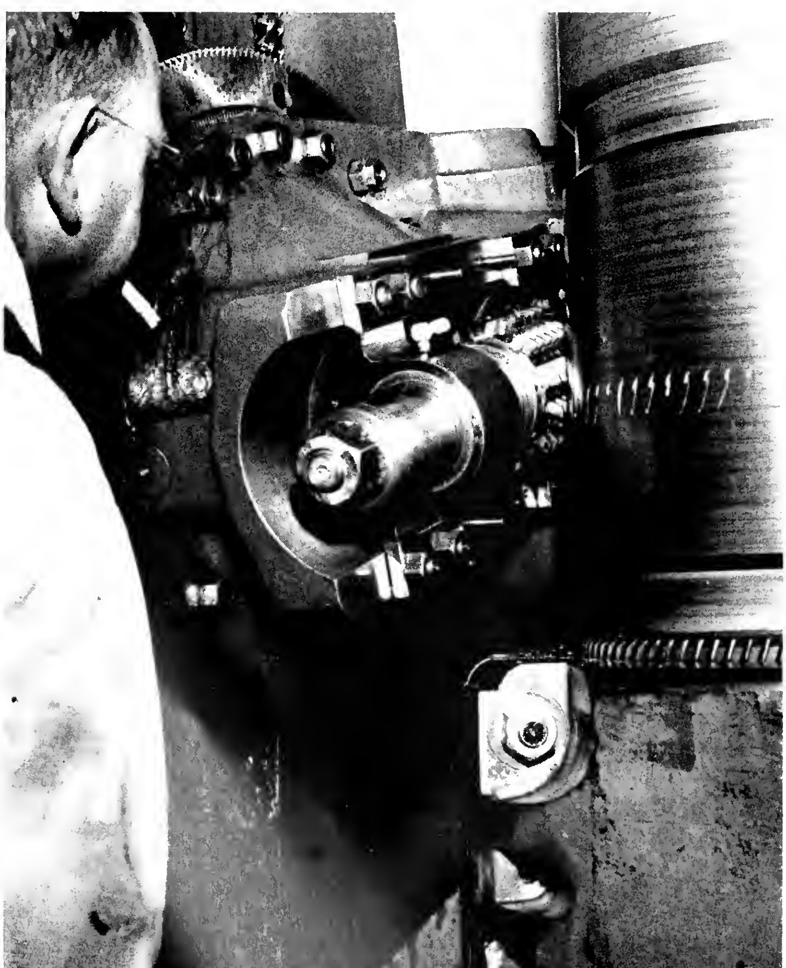
The highly satisfactory results of recent tests sponsored by the Bureau of Ships, Navy Department, Washington, D. C., may provide a solution for one of the most serious bottlenecks in the construction of marine steam propulsion units—the hobbing of main-propulsion reduction gears. It is also possible that the tests may result in important changes of design and method affecting the whole gear-cutting industry.

At the completion of the experiments, Navy engineers indicated that they were planning to proceed immediately with further development of the tools involved and broader application of the principles which the tests seem to have vindicated.

The tests centered around the use of a composite hob, consisting of a hob body and mechanically-held strips of cemented carbide for the cutting edges. Operated as a climb hob, the tool permits roughing cuts at spindle speeds of 100 rpm instead of the present speed of 35 rpm with standard high-speed steel hobs. There were indications, moreover, that if changes were made in the design of the hobbing machine permitting faster operation, the hob would probably perform even more satisfactorily at higher speeds, perhaps 150 rpm (225 feet peripheral speed) instead of the present norm of 45 feet peripheral at 40 rpm. With the 72" machine used, 100 rpm was the maximum possible speed.

When it became apparent in 1942 that even the best available hobbing methods could not keep pace with the program for the production of marine steam propulsion equipment, the Navy Department, Bureau of Ship, initiated research into the possibility of improvements in gear-cutting speed.

When the design was finally approved, the Cleveland Hobbing Machine Company supervised the construction of two hobs 6" in diameter with 2½" bore. They were five-



Locating cut is taken on special low-carbon steel blank with composite high-speed steel hob used for the initial test. Cuts are marked with chalk. Machine is a 72" Gould & Eberhardt hobber. This hob was used at 35 rpm, but carbide tipped hob operated at 100 rpm, maximum possible with this machine.

For Marine Gear Bottleneck

pitch, single-thread hobs with strip teeth, the left-hand one having teeth tipped with cemented carbide (Kennametal K 4-H) and the right-hand one with teeth of 18-4-2 high-speed steel (Braeburn Alloy Steel Company "Twin Van").

Chosen for the site of the tests was the Joshua Hendy Iron Works of Sunnyvale, California, whose assistant general manager, Capt. E. D. Almy, had assisted in the development of the entire project. In preparation for the experiments, Gould & Eberhardt engineers visited the turbine plant to check adjustment of the 72″ hobbing machine which was to be used in the climb-hobbing operation. (Only newer machines can be adjusted for climb hobbing.) Hendy engineers checked both hobs for lead and form. Low-carbon pinion blanks were prepared and mounted on the machine, for initial tests were to be made on softer metal.

The experiments were started on July 11 in the Joshua Hendy turbine shop, with Captain Paul F. Lee, Lieutenant A. J. Kroog, and Richard W. Righter of the Navy Department present, together with interested representatives of the gear and machine-tool industry.

First, the right-hand hob with the 18-4-2 teeth was used on the 72″ machine with the prepared blank, feed up, rotation down, climb hobbing at normal 35 rpm and .045 feed. Then the left-hand hob with carbide tips was adjusted and tested at speeds up to 100 rpm with .045 feed, also climb hobbing. This completed, the operations were repeated on the blank regularly used for the pinions of 8500-hp C-3 marine turbines. Complete performance records were made by Bureau of Ships representatives with the help of Joshua Hendy and Gould & Eberhardt engineers as a basis for future study on the feasibility of further development with composite hobs.

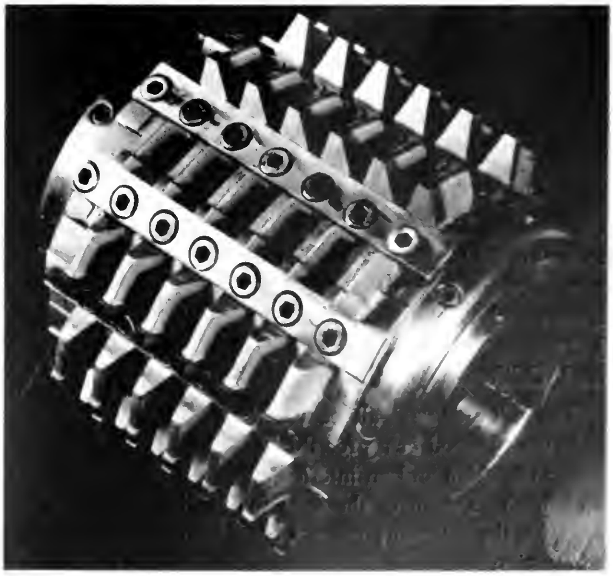
At the completion of a C-3 pinion, the carbide-tipped hob was removed for examination and found to be in much better condition than standard hobs are at the end of the same operation. The gear revealed an exceptionally fine finish and exceptionally accurate helix angles, which Navy engineers attributed to a combination of the clean cutting action of the carbide with climb hobbing.

In a final meeting attended by engineers of the Navy, Joshua Hendy, the Cleveland Hobbing Machine Company, and the Western Gear Works, it was agreed that: "Results of these tests were so highly satisfactory that the Navy will probably proceed with immediate steps in co-operation with Joshua Hendy to develop additional composite hobs tipped with high-productive cutting-tool materials for broader application of the new principles of hobbing, particularly with reference to even the largest marine propulsion gears."

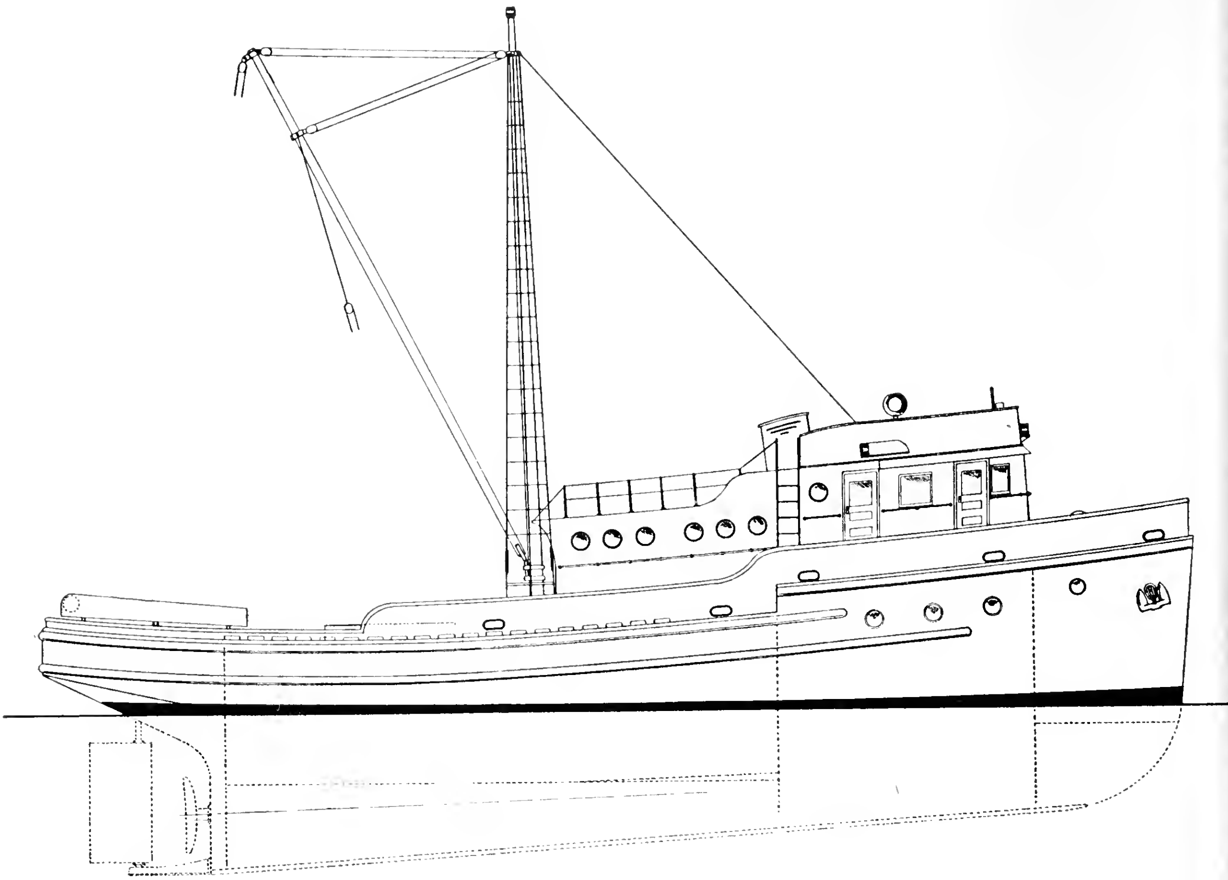
Among the matters tentatively scheduled for future investigation were the use of the composite tipped hob on the 160″ hobbing machine; time required for removal of the carbide strips and replacement with high-speed steel; use of nitrided, chromium-plated, high-speed steel with deep freeze, Stellite, or Tantung strips, and other possibilities such as multiple-thread hobs using these new cutting materials. It was suggested that a new hob might be brought out with four convolutions added to the present length, with the first two or three convolutions tapered. A study will be made by Joshua Hendy to see what changes can be made on existing machines to make them adaptable to higher spindle speeds. Studies may also be made toward design of a new machine which will be capable of climb hobbing and will use carbide-tipped hobs or other high-production cutting materials to the maximum extent.

One of the obvious advantages of the composite hob over the conventional solid one is that in the event of a broken or damaged tooth or teeth, the tooth strip alone may be removed and replaced instead of discarding the whole hob. In addition, heat-treating and hardening techniques are applicable with more control and accuracy to small, individual tooth strips than to an entire hob.

If further study of the findings continues to indicate that cemented carbide is suitable as a cutting medium, the time needed for the cutting of marine gears may be reduced by 66 per cent or more, and the way may be prepared for further innovations which will increase the efficiency of hobbing operations and lead to other important developments in the gear field.



Close-up of the new composite five-pitch, single-thread hob with strip teeth tipped with cemented carbide. It has 11 rows of six teeth each and is 6″ in diameter with 2½″ bore. It is designed for climb hobbing and is capable of operation at much higher speeds than the standard high - speed steel hob regularly used.



Outboard profile of 72-foot steel purse seiner.

An All-Welded Steel Purse Seiner

Indicating the very definite trend to steel in fishboat construction is this very cleverly designed purse seiner from the drawing board of Thomas J. Prentice, naval architect of Oakland, California.

The hull is of steel, all welded, the only use of wood being for the deck inside the cabin and on interior trim and finish. Design of the steel hull calls for the following general characteristics:

Length overall	72′-0″
Length waterline	66′-0″
Molded beam	19′-0″
Draft loaded	10′-0″
Freeboard forward	10′-6″
Freeboard aft	5′-6″
Least freeboard	4′-6″

As will be noted from the drawings reproduced herewith, this design has a trim businesslike profile with ample sheer for strength and a good flare to give a dry deck and wide deck space. Note the Vee bottom, straight line design as shown on sections. This vessel is intended for production with a minimum of mold loft work.

The hull is divided into four watertight compartments by three watertight steel bukheads. These compartments from forward aft are the forepeak, divided into a 580-gallon fresh water tank below and a

pacious compartment for general argo or stores above; the machinery pace; a fish hold; and the after peak.

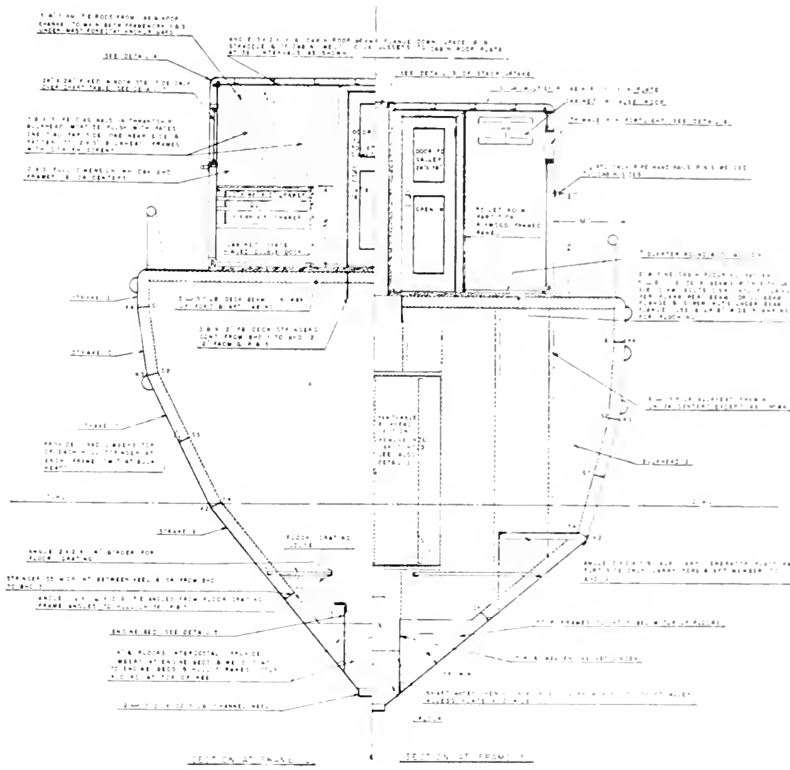
This fish hold is the largest com- artment in the hull. It is 34 feet, 6 iches long, and takes full advantage f the greatest beam. Double bottom inks below this hold have a capacity)r 4250 gallons of fuel oil. An oil- ght shaft alley carries the propeller iaft through these tanks.

The hull is designed to be driven / a 250-bhp diesel engine, and for l auxiliaries to be electric drive. A i-kw, 110-volt diesel auxiliary gen- ating set is slated to take care of ghting and auxiliary power.

Engine room auxiliaries include a ımp for fresh water service to gal- y and to wash basins and scuttle ıtt, a pump for salt water service to ilets, and a large-capacity pump for mbined fire, bilge, and deck wash- ig service.

Deck auxiliaries comprise a wind- ss forward, two cargo winches and arge purse seine winch. The single ıst is fitted with two booms, each which is served by a winch. This rangement allows the use of a otch line for handling fish or other rgo. The large winch is fitted with uble drums and nigger heads for rsing operations.

Provision is made for comfortable eping for two in the captain's arters and six in crew's quarters th modern berths. Considerable ıce is devoted to a toilet compart-



Sectional elevation.

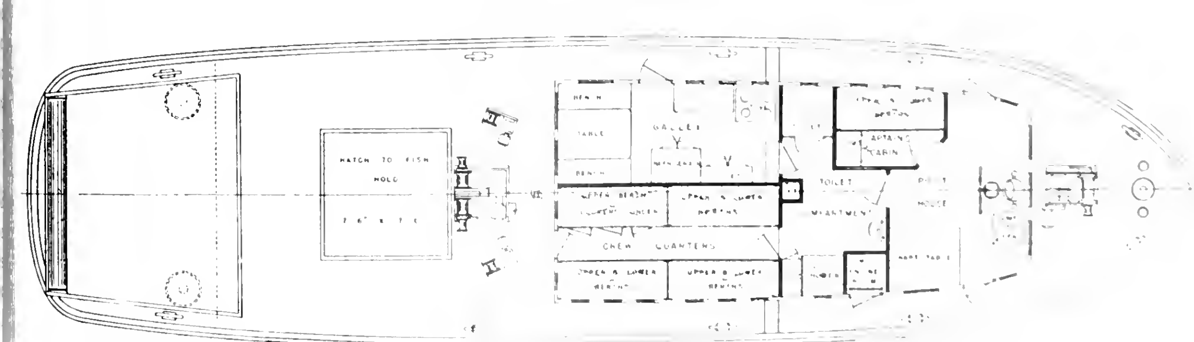
ment which is fitted with a shower and other toilet facilities necessary to men engaged in handling fish.

Opening off the pilothouse is the captain's cabin with upper and lower berth, lockers and desk. Equipment for navigation in the pilothouse includes: complete two-way radio; Fathometer echo-sounding apparatus; standard compass; and radio direction finder. Note on the drawings the large chart table which is fitted with drawers and lockers for storage of charts, flags and navigating instruments.

This hull should have a good turn of speed with her lines and power. The large capacity for fuel oil will provide a large cruising radius.

One is now under construction in Oakland for W. L. McAllister of San Francisco, so that the design will soon have a practical ocean fishing test.

General arrangement, deck plan.



The frigate USS Orlando, with pontoons installed to stern and pusher-type vessel hooked on, ready for the start from Lockport to New Orleans.

(Photo courtesy U. S. Maritime Commission)

Great-Lakes-Built Fighting Ships

Fighting ships and ocean cargo vessels are going to war by way of Chicago, St. Louis, Memphis, and on down the Father of Waters to New Orleans. Vessels more than 300 feet long built on the Great Lakes are reaching salt water by way of the Illinois and Mississippi Rivers. Cities and villages in the heart of the Midwest are getting glimpses of frigates—306-foot submarine hunters for the American and British Navies—and cargo vessels 338½ feet long, but of light draft, for use in shallow waters where larger vessels cannot enter.

The ships are built by Walter Butler Shipbuilders, Inc., at Duluth, Minnesota, and Superior, Wisconsin; also Globe Shipbuilding Company, Superior, Wisconsin, on Lake Superior; by Froemming Brothers, Inc., at Milwaukee, Wisconsin, and Leathem D. Smith Shipbuilding Company at Sturgeon Bay, Wisconsin, on Lake Michigan; and by the American Shipbuilding Company at Lorain and Cleveland, Ohio, on Lake Erie, which yards are under the jurisdiction of the United States Maritime Commission.

Imperative need for these vessels appeared in 1943. Frigates, fast and maneuverable, were needed for convoy duty. These cargo vessels, smaller than the Maritime Commission's standard C-1 type, are desired by the Navy particularly for island operations where narrow ports and shallow water are a consideration.

Shipyards along the coast lines were operating at full capacity building large vessels. The yards on the Great Lakes appeared to be the logical choice for construction of these new type vessels without disruption to the Commission's overall program. The Lake yards had the building facilities, but a serious problem interposed. The completed vessels could not get to sea by the usual route through the eastern lakes into the St. Lawrence River. They were too long. The canals around the rapids in the upper St. Lawrence would only accommodate ships up to 259 feet. Another means had to be found to get these ships to salt water.

The engineering ingenuity that permitted construction of these vessels on the Lakes was displayed when the possibility of taking the ships down the Illinois and Mississippi Rivers was explored. It was found that Chicago's bridges over the

Drainage Canal, which connected Lake Michigan with the Illinois River, were too low, and that the normal nine-foot channel in the rivers was not sufficiently deep for the machinery-heavy sterns to avoid scraping bottom.

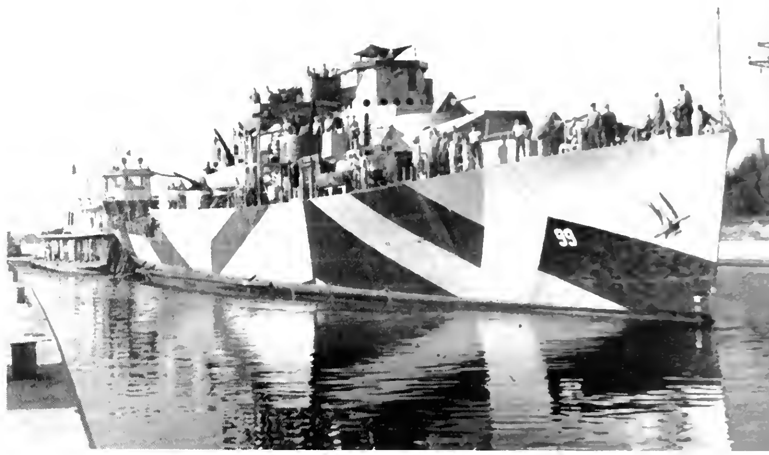
The canal problem was solved by removing the masts on the frigates and shipping enough ballast to get under the bridges. The masts removed at Chicago are replaced at New Orleans.

The sterns of the frigates had to be raised for the long river trip. Air-filled steel drums, 9 feet in diameter and 20 feet long, did the trick, the aft part of the ship being practically lifted out of the water by four pontoons, a pair welded and bolted on either side.

The vessels proceed through the Drainage Canal to Lockport under their own power. Here the pontoons are installed.

After the pontoons are attached the vessels are taken in tow by pusher-type vessels, much used on the Illinois-Mississippi Waterway, and are pushed through the 600-foot lock and lowered 41 feet into the Des Plaines River and move on down into the Illinois River. Here begins the trip across the middle of Illinois and to the Mississippi just above St. Louis, and on to the sea. At New Orleans the pontoons are removed and shipped back to Lockport for another trip.

Frigates are coming off the Great Lakese shipways rapidly. The cargo vessels, just recently put into production, will follow in considerable number. The engineering ingenuity displayed in getting these vessels into ocean service has added the capacities of seven shipyards to the world-wide fighting strength of the United Nations.



Top of page: With pusher-type vessel attached to stern, the frigate leaves Lockport for the long trip from the Great Lakes to New Orleans. Mast is down and stowed on deck.

(Photo courtesy U. S. Maritime Commission)

Center: The frigate with pontoons attached to stern. These pontoons raise the machinery-heavy sterns sufficiently to enable the vessels to be taken from the Great Lakes to the Gulf by way of the 9-foot shallow channel in the Illinois-Mississippi Waterway.

(Photo courtesy U. S. Maritime Commission)

Bottom: The USS Peoria on her sea trial.

J. H. Moloney
Advertising manager, Detroit Diesel Engine Division, General Motors Corporation.

Diesel Goes to War

By J. H. Moloney

The story of the diesel engine in the present war will probably be summed up in history as one of the outstanding achievements of American industry.

One of the immediate needs of our Armed Forces at the beginning of hostilities was motive power and more motive power for use in propelling tanks and landing craft, and in essential equipment of war such as bulldozers, cranes and shovels.

Fortunately many full-fledged production lines existed in the American diesel industry, one of the largest being in operation at the Detroit Diesel plant of General Motors Corporation. The main problem was that of expanding the production facilities to meet the increased demand.

Development of unit engine capacity was important also. For example, the Detroit Diesel Series 71 six-cylinder engine, which had a prewar rating of about 165 hp, has been supplied to the Armed Forces at ratings up to 225 hp and has developed ratings over 300 hp in laboratory tests.

Further advantages were at hand. Most parts of the Detroit engines were identical, engine for engine and cylinder for cylinder. Rotating parts, such as pistons, connecting rods and valves, were interchangeable, and last but not least, the symmetrical cylinder block, which permitted right- or left-hand rotation with accessories on either side. This feature permitted the coupling of two basic engines together by means of a transfer case to deliver the double power to a single driveshaft for the "Twin" Series 71 engine. This twin six was used in some of the American M-3 and M-4 tanks and in the M-10 tank destroyers.

What was done once could be duplicated, and four basic engines were hooked together as a "quad." This was an ideal power plant for the LCI, the landing craft which recently played a leading part on the beaches of Normandy. Today the lion's share of landing craft, LCVP's, LCM's, LCT's and LCI's, are powered by standard six-cylinder Series 71 units in the form of "singles" or "quads."

This principle of combining basic engines into multiples will be used on many peacetime applications.

While at the moment the part diesel is playing in invasions holds the spot light, the utilization of the engine spreads far beyond the beachheads. Here is the list of just those uses of diesel of which the U. S. Navy will permit mention: Submarines and Submarine Mother Ships; SC Subchasers; 131- and 171-foot PC Subchasers; DE Destroyer Escorts; Mine Sweepers; Rescue Vessels; Tankers; Diving Tenders; Landing Boats and Barges; Tank and Cargo Lighters; Dredges; Tank and Tank Destroyers; Tractors and Bulldozers; Shovels; Standby and Portable Generator Sets; Dock Compressors; Lighthouse Service; Buses and Trucks.

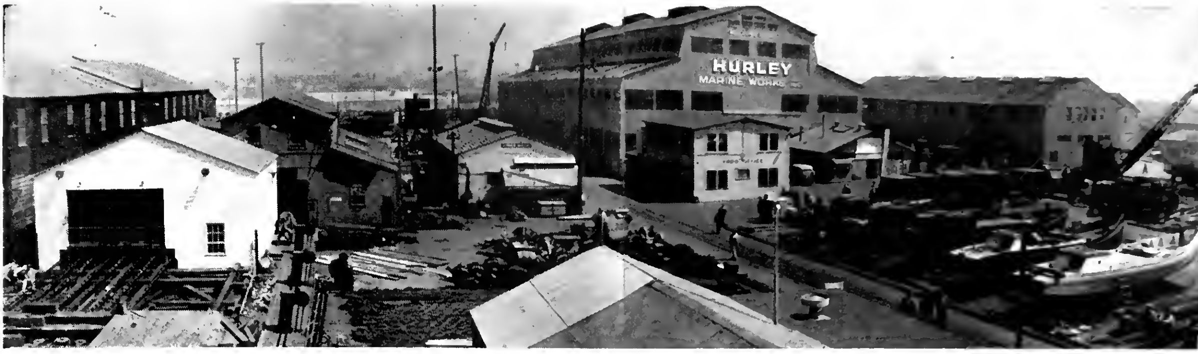
It is also interesting to note another development which has been born during the war relating to the preconceived line of demarcation between the gasoline and diesel engine. The gasoline engine has a compression ratio 5 or 6 to 1; the diesel engine 16 to 1. Beyond 6 to 1 in the gasoline engine, anti-knock properties have been added to the gasoline to permit operation at higher compression ratios. Experimental ordnance vehicles have been constructed with two fuel tanks, one containing diesel fuel and the other gasoline. The diesel cycle engine could operate on either fuel. The comparative economy would be on the order of 10, 14 and 16 miles to the gallon—10 miles per gallon being the consumption with the carburetor engine, 14 with gasoline injected into the diesel cylinder, and 16 with the straight diesel engine. This type of gasoline injection has not as yet reached the practical application stage.

The job of the diesel industry in the war went further than the manufacture of the product. In the Army and Navy camps, bases, and arsenals and shipyards in the United States, and from the Aleutians to Australia in the Pacific, and from Iceland to Africa and Europe in the Atlantic, service representatives of the diesel industry have been constantly on the job assisting and teaching the mechanics in the Army and Navy to "keep 'em running."

"When the battle for freedom is won and our men return home, these implements of war will provide us with tried and proved products for commercial applications. They will be ready for new adventures. People everywhere will discover there has occurred an astounding revolution in the world of mechanical power."

The author is advertising manager, Detroit Diesel Engine Division, General Motors.

Abstract of an address before the Society of Automotive Engineers at Portland, Oregon, August 24, 1944.



A Shipyard's Expansion Program

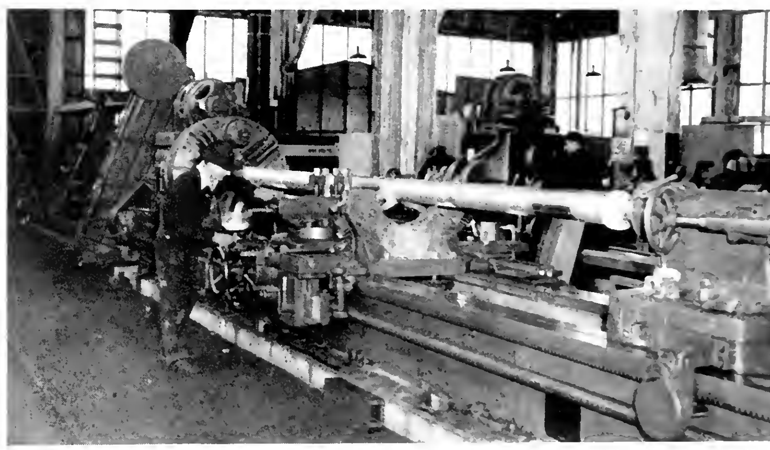
The Hurley Marine Works Inc. of Oakland, whose ship repair facilities, since April, 1940, have been worked to the limit of their capacity, have recently started on an expansion program.

Eighteen acres, to the west of and adjoining the existing plant, have been acquired, and at present are being filled in. On completion of this work, a floating drydock, additional fitting-out piers and several gantry cranes will be installed. The repair shops and their equipment will be increased in size and working capacity as follows: sheet metal shops doubled; electric shops by 75 per cent; and more tools will be added to the machine, plate and pipe shops. A new and well-equipped cafeteria will be built for the use of the employees and staff.

This expansion program, when complete, will mean an increase of 100 per cent in production and a corresponding increase in the labor force, thereby bringing the total number of employees to about 4000.

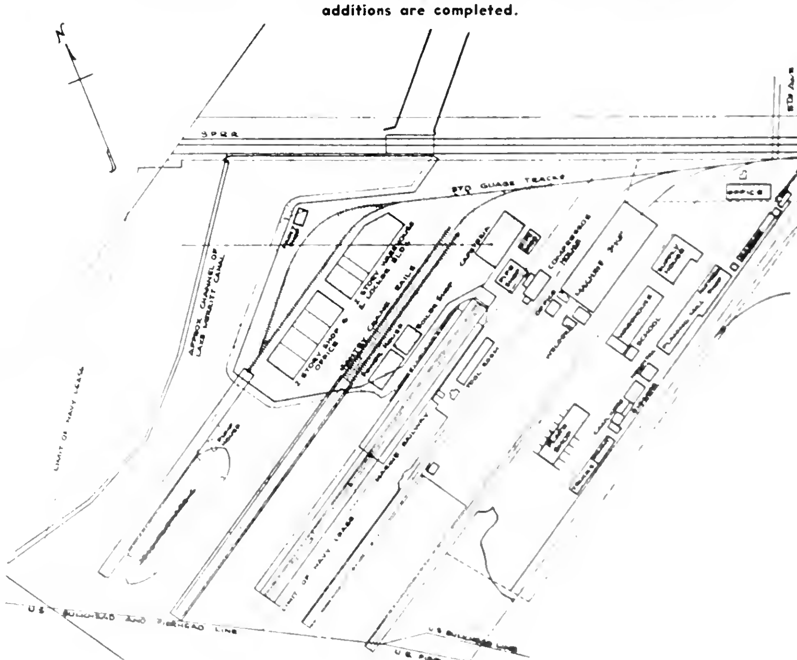
In addition to all this, the company has taken over the property at the end of Livingstone Street in Oakland, which will provide ample fitting-out accommodation for two large vessels. All of this program is under the supervision of the office of the Assistant Industrial Manager, Mare Island Navy Yard, at San Francisco.

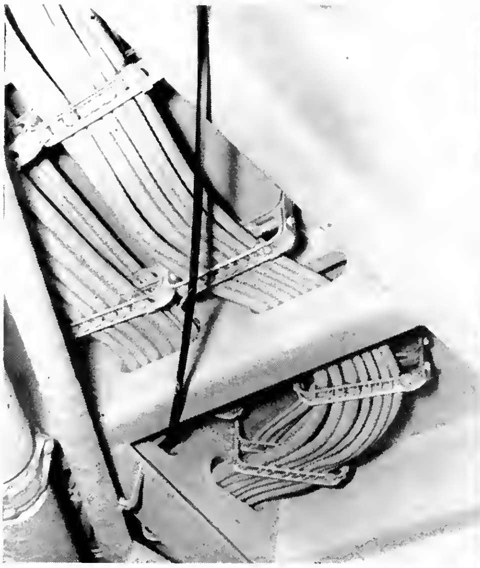
The complete plant will continue under the able management of Jack Hurley, president, and Herbert Magnuson, executive vice president.

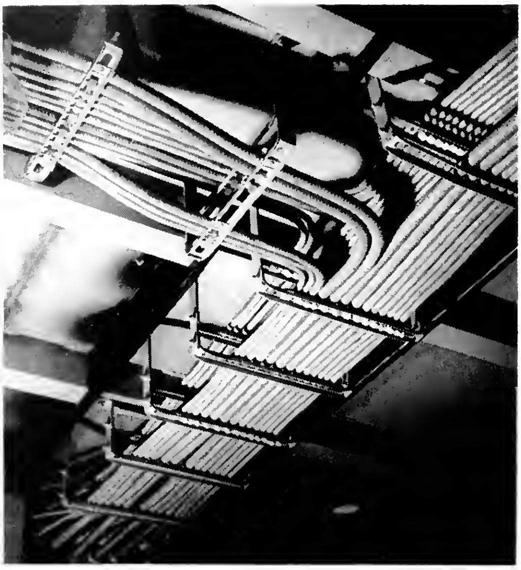


A corner of the machine shop.

The layout plan of the Hurley Marine Works as it will appear when new additions are completed.



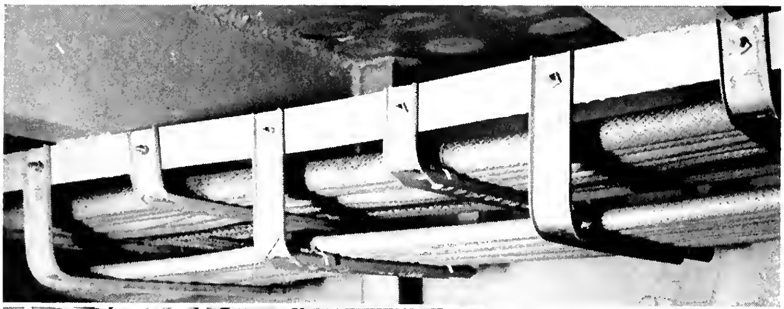


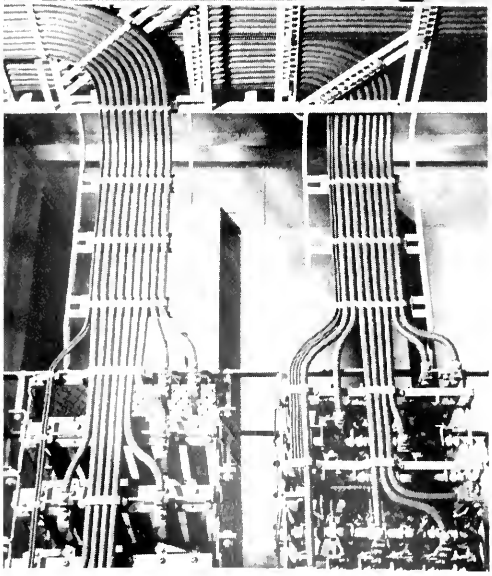


Left: Multiple double tier cable run through longitudinal girders and deck beams.

Right: Main wireway on underside of 2nd deck of small cargo ship.

Kindorf Cable Devices





Above: Two-tier multiple cable run on underside of deck of a C-3 vessel.

Left: Intricate winch house installation between grids and controllers.

The Kindorf Cable Devices are a series of fittings developed recently by the two Kindorf brothers of San Francisco for strapping, locking, stacking and hanging electric cables of all sizes. These novel and ingenious devices are so simple, secure and easy to fit, that 13 of the major shipyards in the San Francisco Bay Area doing Maritime Commission work are now using them. They are manufactured solely by the Kindorf Brothers in San Francisco.

The following is an outline of the important characteristics of these devices:

Simplicity

The straps are all of the one basic pattern, and only one series of sizes is used for all applications. The locking device is standard for all methods of installation. The stacking strap is simple in design, and can be fitted by any journeyman or helper on the job, wherever the need arises.

The single cable hangers are manufactured in two types only, one for close-to-the-metal runs, and one that stands about one inch away from the metal. Either type may be used with studs in way of insulation, and both have a cable size range from 3/8″ to 1¼″ O. D. The same straps which are used for all types of multiple runs

are also used for the single cable hanger. All cable hangers for multiple runs are made of standard 12-gage channel.

The open end hangers for auxiliary cable runs eliminate the use of marlin or wire and have the same simple features found in all the Kindorf devices.

Flexibility

The Kindorf Cable Strapping Devices have great flexibility, which is a very desirable feature in any shipboard installation.

The Kindorf method eliminates the prefabrication of gang straps. All the cables of a ship's entire electrical installation can be rigidly secured without one minute of shop time, and without the necessity of discarding or remodeling one prefabricated unit. Any alterations, either in multiple or single runs, whether they are additions, deletions or rearrangements, can be made quickly and easily without discarding any material, without writing any shop orders, and without any shop time. Another very desirable feature is "adjustability" to any variation in cable size.

Due to design characteristics of the straps, the usual variation of "O. D." found in practically all marine cable is of no consequence. The straps themselves have a size tolerance up to ⅛", which in no way affects the security of the finished installation.

Security

When applied with any degree of reasonable care, there is never a reason for a loose cable or a misfit strap. Each strap of the finished installation is wrapped around one-half of the circumference of one cable. One of the most objectionable features of the old gang strap, the "bellying up" condition, is absolutely impossible when using the Kindorf method. Each cable is held securely by two direct ties to the hanger or mounting. After severe shock tests had been given complete installations, no damage was discovered.

Appearance

A completed cable installation where Kindorf devices and methods have been applied is neat, compact and even beautiful, as the accompanying illustrations show.

Application

It is in the application of the Kindorf methods that some of the most important and superior features of the Cable Devices become apparent.

In the main wireways of a ship's electrical installation these methods permit each cable to be secured permanently, in multiple strapping without the use of marlin or wire. No waste or refabrication is necessary in making alterations. Cables may be added to a run, deleted from a run, transposed in a run, or stacked if necessary, without using any special tools or materials or waiting for refabrication in shop. Many man-hours are saved, since there is no necessity of tying the cable in place with wire or marlin. Vertical or horizontal auxiliary multiple cable runs can be installed in the same simple manner and using the same type of materials.

The Kindorf single cable hanger can be used anywhere where single cable runs are necessary, and may be welded directly or stud welded. Again, the same straps are used. Where it is found necessary to fit a stacked cable between any two or every two cables of any multiple cable run, the method provides positive security to both the top and the bottom cables throughout.

KINDORF METHODS

OPERATIONS COMPARED IN SEQUENCE WITH THE OLD METHOD

Nº	KINDORF METHOD	THE OLD METHOD	Nº
	MANUFACTURING STAGE		
1	NOT REQUIRED	MACHINERY FOR THE MANUFACTURE OR PREFABRICATION OF STRAPPING DEVICES MUST BE PROCURED, SET UP AND MAINTAINED. THE USUAL DEPARTMENT CONSISTS OF THE INTRICATE STRAP FORMING MACHINERY, TOGETHER WITH A LARGE VARIETY OF MANDRILS, METAL SHEARS, PUNCH PRESSES WITH SPECIAL DIES, POWER SAWS, ARBOR PRESSES, GRINDERS, DIPPING TUBS, AND RACKS FOR RUST PROOFING. THIS MACHINERY REQUIRES VALUABLE SHOP SPACE AND PERSONNEL.	1
2	NOT REQUIRED	STORAGE SPACE IS REQUIRED FOR LARGE STOCKS OF FLAT BARS IN VARIOUS SIZES.	2
3	NOT REQUIRED	THE VARIOUS SIZES OF MILL RUN FLAT BAR MUST BE CUT TO USABLE LENGTHS, AND THEN RACKED IN A LOCATION CONVENIENT TO THE STRAP DEPARTMENT	3
4	THE FINISHED PRODUCTS AS DELIVERED TO THE YARD MUST BE WAREHOUSED	THE FINISHED PRODUCTS MUST BE WAREHOUSED	4
	INSTALLATION STAGE		
1	THE CABLE SIZES SHOULD BE DETERMINED BY CALIBRATION.	EACH CABLE OF EVERY CABLE RUN MUST BE CALIBRATED.	1
2	AN ORDER FOR THE PROPER SIZE STRAPS MUST BE WRITTEN.	A PROPER ORDER MUST BE WRITTEN SHOWING EACH AND EVERY VARIATION IN CABLE SIZE, NUMBER OF CABLES, CABLE SEQUENCE, AND THE EXACT WIREWAY LOCATION. DRAWINGS MUST BE MADE OF ALL SPECIAL TYPES OF STRAPS REQUIRED	2
3	A STOCK OF THE VARIOUS SIZES OF STRAPS REQUIRED SHOULD BE MADE AVAILABLE RIGHT ON BOARD SHIP	THE ORDER AS WRITTEN ON BOARD SHIP MUST BE DELIVERED TO THE STRAP DEPARTMENT AND GIVEN ITS PROPER PRIORITY	3
4	NOT REQUIRED	THE PROPER WEIGHT AND LENGTH OF FLAT BAR OR BAND IRON MUST BE SELECTED FROM THE RACKS.	4
5	NOT REQUIRED	THE PROPER SIZES OF STRAP FORMING MANDRILS MUST BE SELECTED FOR EACH VARIATION INDICATED IN THE STRAP ORDER.	5
6	NOT REQUIRED	THE STRAP FORMING MACHINE MUST BE SET UP FOR THE FIRST TYPE OF STRAP THAT IS TO BE FORMED.	6
7	NOT REQUIRED	THE BAND IRON OR FLAT BAR IS INSERTED IN THE STRAP FORMING MACHINE AND THE FIRST STRAP OF THE STRAP ORDER IS FORMED.	7
8	NOT REQUIRED	ADDITIONAL MANDRILS MUST BE SELECTED AND THE STRAP FORMING MACHINE MUST BE RE-SETUP FOR EACH VARIATION OF SIZE AND SEQUENCE INDICATED BY THE STRAP ORDER.	8
9	NOT REQUIRED	AFTER THE STRAPS ARE FORMED THE ENDS OF EACH STRAP MUST BE TRIMMED AND PUNCHED	9
10	NOT REQUIRED	THE COMPLETED ORDER MUST BE STRUNG ON WIRE OR SYSTEMATIZED AND TAGGED FOR IDENTIFICATION	10
11	NOT REQUIRED	THE STRAP OR STRAPS MUST BE IMMERSED IN ZINC CHROMATE OR EQUIVALENT AND HUNG ON THE DRYING RACKS	11
12	NOT REQUIRED	AFTER DRYING, THE STRAPS MUST BE DELIVERED TO THE PROPER WIREWAY LOCATION INDICATED ON THE ORIGINAL ORDER.	12
13	NOT REQUIRED	THE VARIOUS STRAPS OF THE ORDER MUST BE SEGREGATED AND THE EXACT HANGER FOR EACH INDIVIDUAL STRAP MUST BE DETERMINED.	13
14	REGARDLESS OF ANY ALTERATIONS THAT MAY HAVE BEEN MADE, KINDORF STRAPS MAY BE INSTALLED IN ANY COMBINATION WITHOUT THE USE OF ANY SPECIAL TOOLS WHATSOEVER.	PROVIDED THERE HAS BEEN NO ALTERATIONS OR ERRORS DURING THE ABOVE OPERATIONS 2 TO 14, THE STRAPS MAY BE INSTALLED. THIS STEP OFTEN REQUIRES THE USE OF POWER DRILLS AND C CLAMP.	14

British motorship Gay Viking, one of the flotilla that has run the German blockade of the Skagerrak to bring cargoes from Sweden to British ports. *(British Official Photo)*

Most Modern Blockade Runners

One of the boldest achievements of the British Merchant Navy, it was recently revealed, has been the maintaining during the winter of a service by sea between the east coast of Britain and the small Swedish port of Lysekil. The "Red Duster," the flag of the British Merchant Navy, has again flown in the ports of Sweden, after an absence of three and a half years.

Plans for operating such a service, notwithstanding the close German blockade of the Skagerrak, were discussed early last year, when it became important to bring to Britain certain types of material manufactured in Sweden in quantities greater than could be conveniently transported by air.

For this purpose it was decided to prepare special vessels. These blockade-runners were small, so as to be inconspicuous and easily maneuverable, but were designed to carry a large quantity of cargo in relation to their size. Their powerful diesel engines gave them a very high turn of speed. They were defensively armed as merchantmen and carried Oerlikon guns to protect them from air attack.

Each vessel carried a crew of about 20. These men were all volunteers and received special training to equip them for the hazards and rigors of the blockade-running service. Their average age was only 25, and many of the sailors were under 20. All the masters were under 40.

Comfort was sacrificed in favor of cargo space. The deck house was an example of this, since, although it housed all the ship's officers, the saloon, the galley and wireless room, it measured only 36 feet by 14 feet 6 inches. The crew was housed rather more commodiously in the fo'c'sle. In each saloon hung a portrait of Prime Minister Churchill, and in each captain's cabin there was a picture of Sir Francis Drake!

Finally everything was ready, and the crews, who had been thoroughly schooled in their work, including gunnery—as, there is reason to believe, German aircraft know to their cost — made their first voyage last autumn.

From that time onward the service was kept up throughout the period of long nights, and most useful cargoes and a number of valuable passengers were safely transported. Each trip in the running of the blockade involved, of course, the dangerous sea passage through the Skagerrak and part of the Kattgat between the enemy-occupied countries of Norway and Denmark, but details of the individual voyages must, for the present, remain secret.

Many ruses and subterfuges were employed, and so successful were they that some of the trips were described by those carrying them out as "uneventful." The operations owed their success to a combination of careful planning, courage, bluff and grand seamanship. Sometimes there was perhaps an element of good luck as well.

The crews were received with the greatest kindness by the inhabitants of the Swedish ports they visited, and the people made it very clear that they welcomed the resumption of the traditional maritime trade with Great Britain. They certainly earned the gratitude of the crews.

Ellerman's Wilson Line were, appropriately enough, the operators of the service, and the ships were Gay Corsair (Captain R. Tanton, O.B.E.); Gay Viking (Captain H. Witfield, O.B.E.); Hopewell (Captain D. Stokes, O.B.E.); Master Standfast (Captain G. R. W. Holdsworth) and Nonsuch (Captain H. W. Jackson, O.B.E.). One vessel of the flotilla, Master Standfast, failed to get through and was captured by German surface craft. Her master, Captain Holdsworth, lost his life. Apart from this, enemy action caused neither damage nor casualties.

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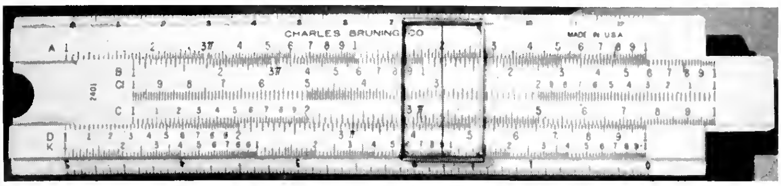
NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK



New slide rule.

New Slide Rule

To fill the need for a high-precision, high-quality pocket slide rule which could be offered to engineers at a moderate price, the Charles Bruning Company, New York and Chicago, has just announced its new Bruning 2401, 5-inch pocket slide rule.

Notable features of the slide rule are the precision and permanency of its graduations. Graduations and numerals of the CI scale are in red to facilitate reading. Tension on the slide is easily adjustable. The indicator is enclosed in a frame of stainless steel that holds it firmly in place and eliminates "wobble." A, B, CI, C, D, K, S, L and T scales are shown on the rule in order to adapt it to the widest possible range of service. The beveled edges of the rule are in graduated scales of both inches and centimeters.

Multi-Spindle Mill Cuts Boring Time 85 Per Cent

The job of facing and boring five gear-center bearing holes in the reduction-gear case of a C-3 steam turbine used to take three weeks, but now it is being done in three days at the Joshua Hendy Iron Works, Sunnyvale, Calif., by performing the work simultaneously on a specially constructed and adapted G. & L. mill, which assures measurements and produces a case interchangeable in all respects.

Built with three spindles for another purpose, the machine was available when work started on the C-3 gear cases, which are 18′ 8″ long, 13′ 9″ wide and 13′ 2″ high. Original plans were for using the mill to face and bore the three gear-center bearings in the main part of the case, leaving the pinion-shaft bearings in the top section of the case to be done on another machine.

Plant engineers drew up plans for the installation of the new spindles; plant maintenance men rigged up the machine. The most delicate task was that of adjusting the shafts and heads for the precision work, since the maximum tolerance between all shaft centerlines and in the bearing holes themselves must be kept under 0.003 inch. But when that was once accomplished the spindles would need no further adjustment for the duration of the job. The operator is freed from the responsibility for measurements and adjustments, and can push the work full speed ahead without worry.

The multi-bore principle has, of course, been widely used, especially in the automotive and airplane industries, but Hendy engineers believe that the gear-case job is probably one of the largest applications that has ever been made.

Machine for Precision Grinding Diesel Fuel Injection Valve Seats

The Cooper-Bessemer Corporation's need for a fast method to replace the hand lapping of the needle valves and valve seats in the fuel injection system of diesel engines was the reason for a machine's being designed and made in the company's development laboratory. The performance of the grinder has enabled these valve seats to be turned out in quantity and with such precision that hand lapping is unecessary.

The machine itself is powered by two air motors, one to drive the grinding tip and one to revolve the valve seat.

In the accompanying illustration will be seen the motor for driving the grinder, mounted at the angle of the seating surface of the valve base. The motor for driving the

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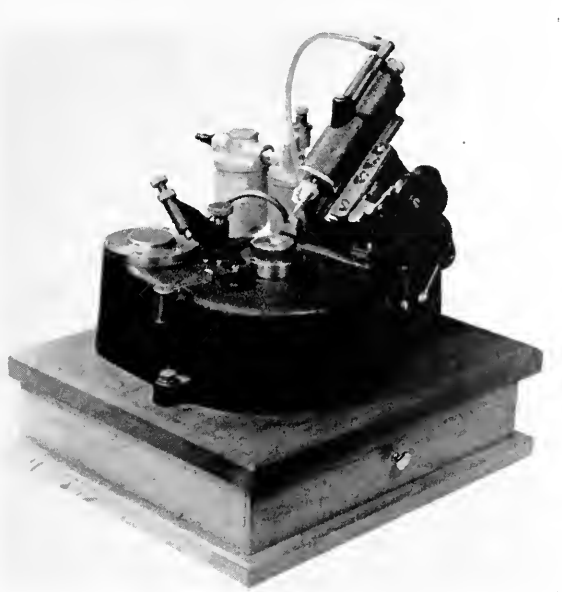


Machine developed by Cooper - Bessemer for precision grinding of fuel injection valve seats.

valve seat is enclosed, and can be identified by the top-plate fastened by screws seen at the left.

The valve seat is held beneath the knurled chuck seen immediately in line with the grinder shaft, and is turned in the opposite direction to the grinding motion.

The driving air motor is of conventional design and is lubricated by a filter feed attached to the air line. The compressed air connection can be seen center-left of the illustration on the air filter, mounted in series with the oil filter, which is partially hidden by driving motor housing.

Another unusual feature of the Cooper-Bessemer valve seat grinder is the tool dressing point, which is made a part of the unit. In the illustration can be seen the diamond point tool dresser which is swung around into contact with the grinding tip when dressing is necessary.

This Cooper-Bessemer production tool is particularly important since the fuel injection system constitutes the real heart of diesel performance and anything which improves the dependability and accuracy of fuel injection improves also the overall efficiency.

Engine Exhaust Silencer Valve

An engine exhaust silencer valve with an angled (45-degree) exhaust outlet is said by the manufacturer to be a positive means of controlling engine exhaust noise. It may be manually controlled and operated—is of cast-iron body with a bronze flap operating lever held on bronze

Engine exhaust silencer valve.

hinge pins by means of two wire-locked set screws and connected to an anchor stud on the body by means of a tension spring. The manufacturer's recommendations state that it may be used on any yacht or other small craft powered with internal combustion engines where it is desirable to throttle exhaust noises. At present it is in wide use on invasion landing barges and other small military boats. The usual method of installation makes use of a short length of rubber hose which is fitted to the bottom outlet of exhaust control valve to absorb vibrations.

It is manufactured by the J. A. Zurn Mfg. Co. of Erie, Pa.

An Improved Gate Valve

A completely new line of cast steel gate valves, with basic improvements in design, has just been introduced by The Edward Valve & Mfg. Co., Inc., East Chicago, Ind.

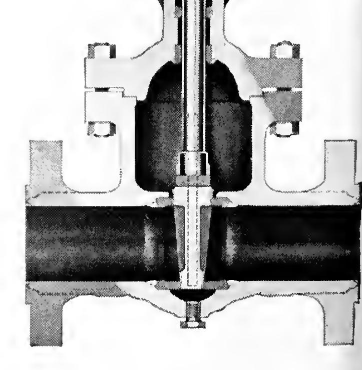
A new valve catalog, No. 12-E1, is just off the press, and includes illustrations, complete details of design, and dimensional data.

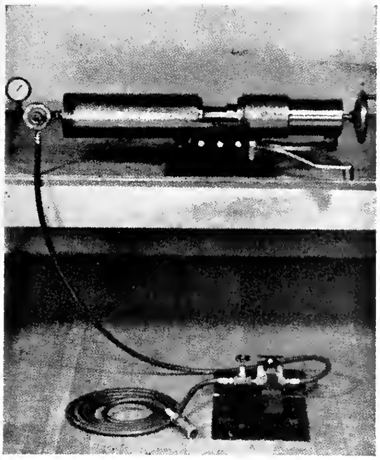
To achieve perfect alignment of all working parts, close-fitting wedge guide ribs are constructed by a new method which eliminates unnecessary and wear-producing drag across seating faces.

Seat rings of the new gate valves are hard surfaced and welded integrally to the body. Specially built fixtures permit hydrostatic test of both seating faces simultaneously, in contrast with the customary procedure of testing one face at a time. All of the company's gate valves 4 in. and larger are ball bearing equipped. In the smaller sizes bearing plates for yoke bushings are EValized, a special Edward plating process, to reduce operating effort.

The new gate valves are being built in 300, 600, 900 and 1500 psi classes and in sizes 2½ to 12 in., inclusive. They are available in some sizes and pressure classes for immediate shipment out of stock.

Improved gate valve.





This air-power press makes any size pack in a few seconds.

Tube Packing Press

The Manpower Tube Packing Press, manufactured by Ray H. Cowles, 7 Front St., San Francisco, is a new, safe and speedy machine for turning out preformed tube packing for electrical cable stuffing boxes.

In contrast to the old method of packing the tubes by hand after the cable was in place, this tube packing press performs the packing right on the work bench, using your own stock of packing. The press is operated by air pressure with foot control, and turns out the finished job with complete uniformity of packing. Production of a single workman in a West Coast Navy Yard has been stepped up from 20 to 400 packings a day; in fact, it was found that the entire time spent on a destroyer escort vessel in pulling cables was cut 50 per cent, and the result was a much better job.

It can be attached to any work bench, is adaptable for any size of packing, and can be handled easily and safely by women personnel.

Stability and Trim Indicator

The Ralston Stability and Trim Indicator, made by Kenyon Instrument Co., Huntington, L. I., solves the complex problems of balance for ships carrying heavy cargoes. The device is applicable to every type of cargo ship. It eliminates the troublesome calculations of trim and measure of initial stability, known to mariners as "G. M." (height of the metacenter M above the center of gravity G), by presenting a visual picture of balance before and during the process of loading and discharging cargo. The indicator can obtain the stability and trim of a boat under any conditions, even if loading and discharging operations are carried on simultaneously. Another feature is "slacker flaps," which are invaluable in ascertaining changes of G. M. as water and oil are consumed.

The indicator is mounted in a solid mahogany box, fitted with a compartment for working parts. A profile plan of the ship is engraved on an aluminum plate. This plate is attached to an aluminum frame which can be raised or lowered by means of knife-edged pivots at the sides and at each end. The top of the frame on one side and on one end features engraved scales. Sliding blocks operated by rack and pinion work along these scales. The balancing block at the end of the frame is for G. M.; that at the sides for the trim. Various brass and aluminum weights representing from 500 tons to two tons or less are balanced in compartments for loading, while special weights are supplied for double bottoms, oil fuel and water ballast tanks.

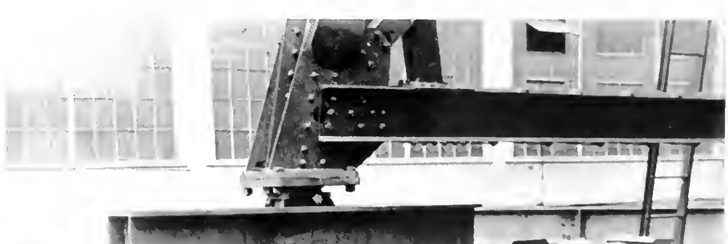
For loading, the tray is rested on the base (pivots disconnected) and the weights representing cargo are placed in respective "holds" on the plan. The G. M. and trim are then determined by balancing the tray on the pivots. The measure of stability is obtained by manipulating the G. M. weights along the rack until the tray is balanced. The trim is recorded by lowering the end levers and following the same procedure for G. M. When balanced without weights the tray shows the ship in its original condition with no cargo but boilers filled to working level.

Slacker flaps measure a loss of stability during a voyage due to use of water and oil. Hinged weights fixed on top of the tray are turned to the "down" position when the double bottom tanks are either full or empty. If during the trip any of these tanks become slack, the knob is switched to the "up" position, thus effecting a control equivalent to the loss of metacentric height due to the area of the free liquid surface. The weights representing a full tank must then be replaced with another denoting the loss.

Deck cargoes of a heavy nature may have a decided effect on the "angle of heel" a ship will take. The Ralston instrument and slide rule may easily determine this. Chilled meat cargo, among other shipments of odd size, shape and weight with varying centers of gravity, may be fixed to travel safely.

The indicator trim may be operated as an aid in docking a boat at a particular length of space. Experiments for this and other problems are described in detail along with the instrument.

DRIVE TRUCK OF GANTRY CRANE



Drive truck of a shipyard gantry type crane powered by a Westinghouse gearmotor. Compactness, ease of assembly and positive flow of power are requirements for drives for this service.

The California Breaker Ration-Unit

A breaker in nautical parlance is a small keg or cask used for holding a supply of fresh water. Such a cask was always a part of the equipment of a lifeboat, and as the British limey said, after World War I, when declaring he would have no truck with Germans, "Lord knows it's thirsty in an open boat when the water breaker's dry."

Since the widespread use of the submarine and the airplane against merchant fleets, a great deal of thought has been given to improving lifeboat rations and to the packaging of these rations so as to make them, as far as possible, immune to sea and other hazards. A fine contribution to this improvement has been made by the California Ration and Equipment Co. of San Francisco in their new California Breaker Ration-Unit.

This unit contains the water and food rations for one man to meet the requirements of the Marine Inspection Division of the U. S. Coast Guard, consisting of 10 quarts of water and 56 oz. of concentrated food, all packed in 8 uniform sterilized, hermetically-sealed rectangular cans, carefully packaged in a corrugated cardboard shipping container.

These ration-units are prepared in a modern factory equipped with specially-designed machinery for preparing, filling, closing and sealing the cans used and the water and concentrated food items with which the cans are filled.

To eliminate contamination of any kind, the cans, in special jigs holding nine cans, are fed through a sterilizing table where they are subjected to a heavy spray of water and then pushed forward into the next section of the table, which contains a steam bath. From this point to the end of the table, the cans pass over a group of sterilamps which have proved to be very fatal to bacteria.

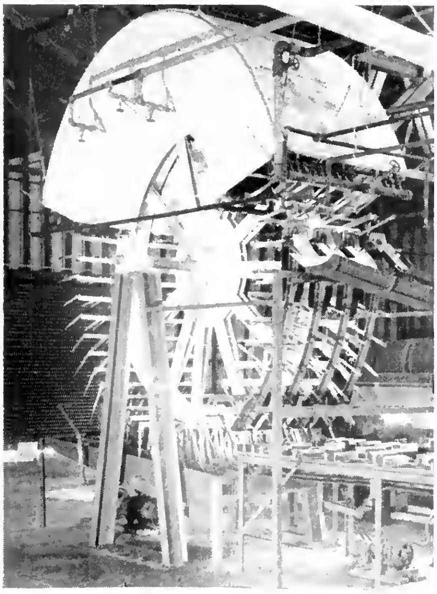
The cans are now ready to be filled with water that has been filtered, purified and sterilized.

The stainless steel filling tank, as shown in the illustration, contains many sterilamps and automatically fills nine cans of water to the proper quantity with one lever motion.

As the covers follow the cans through the sterilizing table, they are placed on the filled cans as quickly as possible. The cans and covers, being in special holders, eliminate handling by human hands.

The cans are sealed immediately after being filled and placed on an automatic four-section feed table where the cans are picked up automatically by arms extending from a dipping wheel and carried through a solution of wax, giving the cans protection against salt water and weather. The wheel, turning clockwise, carries the cans through an overhead oven where the wax is completely dried. As the cans leave the oven they are automatically discharged on chutes, one chute taking care of three cans of water and one chute taking care of one can of food. The cans are then packed in cartons at the end of the chute and conveyed automatically to the rear of the plant, where they are stored for shipment.

This ration-unit insures 10 quarts of potable fresh water in sterile aerated condition for each lifeboat occupant, and, also, in fresh edible condition, dry rations comprising 14 oz. each of "C" ration, malted milk tablets, pemmican and chocolate. The California Ration are equipped to manufacture 2000 units a day of one eight-hour shift.



Left: Can-dipping wheel and drying oven.

Below: Sterilizing table and stainless steel filling tank.

On the Ways—
SHIPS IN THE MAKING

These 20,000-ton super-troopships once rested side by side in adjoining outfitting basins at U. S. Steel's Federal shipyard at Kearny, N. J. In this Official Navy Photo they are again near neighbors while ferryng troops overseas.

A Celebrated Training Ship Honored

Perpetuating the name of a celebrated training ship of the State of New York, the APA St. Mary's was christened on September 4 at the California Shipbuilding Company's yards at Wilmington, California. Mrs. Arthur M. Tode, wife of the Chairman of the Board of Visitors of the New York State Maritime Academy, and Honorary President of The Propeller Club of the United States, sponsored the ship.

The sloop of war St. Mary's was built just 100 years ago in 1844. She was in Admiral Perry's fleet that opened up Japan in 1850.

Named for the first colonial settlement in Maryland, she was 149 feet, 3 inches in length, and had a tonnage of 766 and an original battery of 20 guns. Following her commissioning as a naval vessel in 1844, she cruised with the Home Squadron and saw active service in the Mexican War, taking part in the capture of Tampico in 1846. She continued in active service until 1873.

When the St. Mary's was commissioned as a schoolship in 1874 she had substantially the same fittings as when in active naval service, with the exception of her guns. She served as a training ship until February, 1908.

Hundreds of active merchant marine officers were trained on the famous old St. Mary's, and all of them remember her with deep appreciation. In this connection, it is interesting to note that the new vessel bearing this famous name is to be commanded by Commander Edward R. Glosten, USNR, Commandant of Cadets of the New York Maritime Academy, who made his first cruise to sea on the old ship.

Featured of Federal's Super-Troopship

How scores of thousands of invasion-bound G. I. Joe's were safeguarded en route was revealed in a recent issue of "The Halyard," published for employees of U. S. Steel's Federal shipyards. The story makes public newly privileged details about super-troopships, nine of which had been built when this story was released.

These ships have been made safe by speed, fine construction, a defensive armament of three types of guns and the skill of the naval crews which operate them.

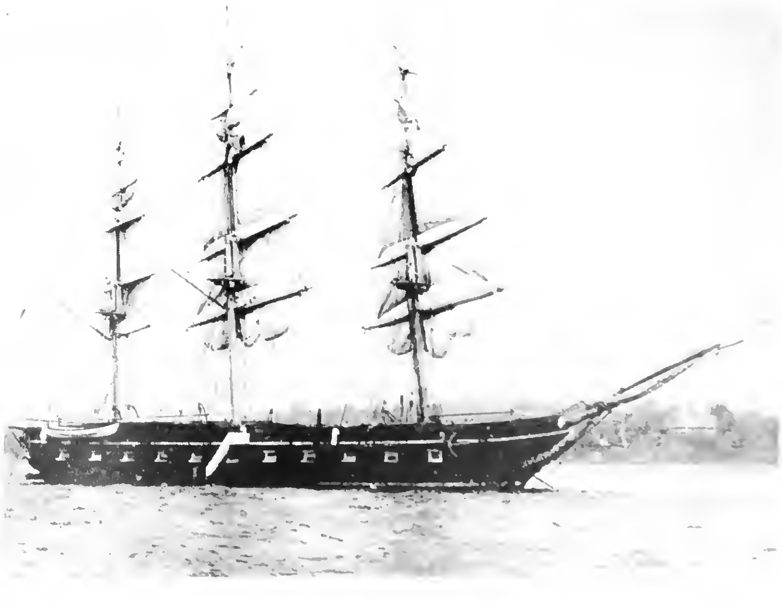
Aboard the troopships, the lives of our fighting men are safeguarded also by the many precautions taken against the spread of fire if they are hit by bomb, shell or torpedo.

All-metal furniture is used throughout. All curtains are of glass fiber. Even the paint used is a fire-retardant type.

Aboard each ship are 80 fire plugs and 21,000 feet of hose. At each outlet, also, there is the latest type equipment for making artificial fog, now recognized as the most effective method of smothering most types of fire. The fire is strangled because it gets no oxygen to keep it going.

There is a "fog" sprinkler system installed to spray certain steel bulkheads and keep them cool in order to confine a fire area. A fire-detecting system and a carbon dioxide fire-smothering system are installed in each hold. And, in case of failure of the ship's fire pumps, two 1000-gallon-per-minute emergency diesel pumps can be pressed into instant service.

The 106 separate ventilating systems installed in these "ships without portholes" constitute another safety factor. The ship can go right on "breathing" even though attack may have caused serious damage in some part of it.



The sloop of war U. S. S. St. Mary's.

Merchant Ship Production Lags

Military type vessel production with the additional man-hours required for this construction has continued to affect the August merchant ship deliveries and tonnage record turned out by the U. S. Martime Commission shipyards.

Of the 119 ships, aggregating 1,157,602 deadweight tons, delivered during the month, 28 were of special military type. Sixteen standard tankers were the largest component of standard long-range type of merchant construction delivered. Other vessels turned out were: 9 Victory cargo, 7 standard C-type cargo, 5 coastal cargo, 1 concrete cargo, and 3 concrete barges.

East Coast yards produced half of the month's deliveries, with the building of 50 ships or 508,164 deadweight tons, 43.9 per cent of the total tonnage. West Coast yards included 7 military types and 9 Victory cargo ships in the 30 vessels built, or 292,068 deadweight tons, 25.3 per cent of the total. Gulf Coast produced 34 ships, 348,360 deadweight tons, 30.1 per cent; while the Great Lakes delivered 5 ships, or 9010 deadweight tons, 0.7 per cent of the tonnage.

The number and types of vessels built by all yards follow:

Shipyard	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co.	4	Tankers
American Shipbuilding Company, Cleveland, O.	2	Military Types
Avondale Marine Ways, Inc., Westwego, La.	1	Coastal Cargo
Barrett & Hilp, San Francisco, Calif.	3	Concrete Barges
Bethlehem-Alameda Shipyard, Inc.	1	Military Type
Bethlehem-Fairfield Shipyard, Inc.	9	Libertys
Bethlehem-Sparrows Point Shipyard, Inc.	1	Military Type
California Shipbuilding Corp.	5	Victory Cargo
	1	Military Type
Consolidated Steel Corporation	2	Military Types
	2	C-Type Cargo
Delta Shipbuilding Company, Inc.	7	Libertys
East Coast Shipyard, Inc., Bayonne, New Jersey	3	Military Type
Federal Shipbuilding & Dry Dock Co.	1	Military Type
Froemming Brothers, Milwaukee, Wisconsin	1	Coastal Cargo
Globe Shipbuilding Company, Superior, Wisc.	2	Military Types
Ingalls Shipbuilding Co.	1	Military Type
	1	Coastal Cargo
J. A. Jones Construction Co., Inc., Brunswick, Ga.	4	Libertys
J. A. Jones Construction Co., Inc., Panama City, Florida	4	Libertys
Kaiser Cargo, Inc., Richmond, Calif.	1	Coastal Cargo
Kaiser Company, Inc., Swan Island	6	Tankers
McCloskey & Co., Tampa, Florida	1	Concrete Cargo
Moore Dry Dock Co., Oakland, Calif.	2	Military Types
North Carolina Shipbldg. Co., Wilmington, N. C.	1	C-Type Cargo
	4	Military Types
New England Shipbuilding Corporation	9	Libertys
Oregon Shipbuilding Corporation	2	Military Types
Pendleton Shipyards Company, Inc., New Orleans	1	Coastal Cargo
Pennsylvania Shipyards, Inc., Beaumont, Texas	1	C-Type Cargo
Permanente Metals Corporation	1	Military Type
	4	Victory Cargo
Pusey & Jones Corporation, Wilmington, Del.	1	C-Type Cargo
St. Johns River Shipbuilding Corp.	5	Libertys
Southeastern Shipbuilding Corporation	5	Libertys
Sun Shipbuilding & Dry Dock Co.	6	Tankers
	2	C-Type Cargo
	1	Military Type
Todd-Galveston Dry Dock, Inc.	1	Military Type
Todd-Houston Shipbuilding Corp.	7	Libertys
Walsh-Kaiser Co., Inc., Providence, R. I.	3	Military Types

The launching party. Left to right are: Capt. C. O. Kell, U.S.N., supervisor of shipbuilding, San Francisco; Lieut. Comdr. Hart R. Aaron, U.S.N.R.; Mrs. Aaron, sponsor, Mrs. Robert E. Christy; Mr. Christy, president of United Engineering Company; and Ruth Jean and Avro R. Aaron, daughter and son of the sponsor.

(Official U. S. Navy photos)

UNITED ENGINEERING LAUNCHES 21ST TUG

The United Engineering Company launched its 21st fleet tug at its Alameda yard on September 7. Mrs. Hart R. Aaron, wife of Lieutenant Commander H. R. Aaron, USNR, acted as sponsor.

When this ship has been outfitted and in commission, United's contracts with the U. S. Navy for fleet tugs will have been completed.

The yard at Alameda was started in June, 1941, and the first keel was laid in September, 1941. At the launching ceremony Captain C. O. Kell, USN, Supervisor of Shipbuilding for the 12th Naval District, congratulated the employees and management on their past fine performance, and said that a continuation of this performance would be required in carrying out the very extensive ship repair and conversion program which now lies ahead.

Robert E. Christy, president of United, was master of ceremonics.

USS Wenatchee slides down the ways.

Log of Coast Launchings

From August 15 to September 15.

California Shipbuilding Corporation, Wilmington:

The 7th combat loaded transport, SS Kittson, slid down the ways on August 28.
The 2nd 455-foot troop transport SS Lanier launched on August 29.
The 9th combat transport, SS La-Grange, christened on September 1.
The 11th transport, SS Allendale, left the ways on September 9.
The 12th attack transport, SS Arenac, launched on September 14.

Consolidated Steel Corporation, Wilmington:

The C-1 vessel SS Cape Spear slid down the ways on August 25.
Combat transport USS Catron launched on August 28.
Combat transport USS Clarendon christened on September 12.

Bethlehem Steel Company, Shipbuilding Division, San Francisco Yard:

The cruiser USS Tucson launched on September 3.

Bethlehem Steel Company, Shipbuilding Division, Terminal Island:

The destroyer USS Willard Keith slid down the ways on August 30.

Bethlehem-Alameda Shipyard, Alameda:

Navy transport USS Admiral C. F. Hughes launched on August 27.

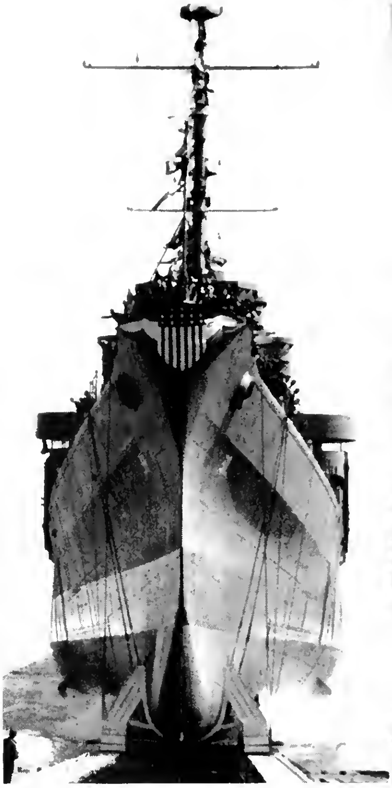
Kaiser Company, Yard No. 3, Richmond — 12th Naval District launching:

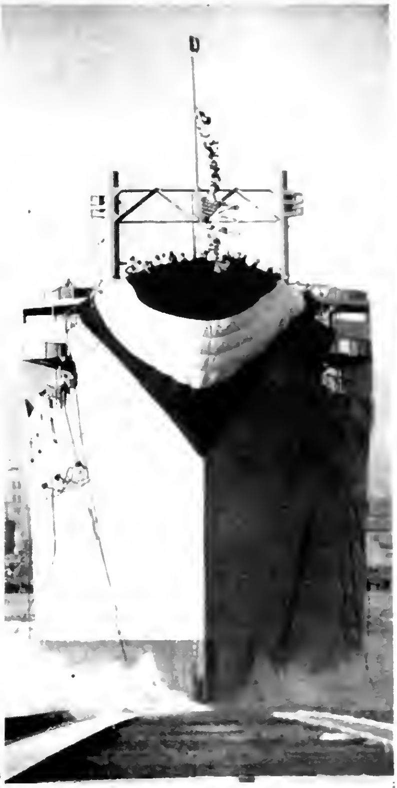
Troop transport USS General R. M. Blatchford launched on August 27.

Marinship Corporation, Sausalito:

Navy oiler USS Soubarissen christened on August 12.
Tanker SS Lost Hills, now in outfitting, launched on August 29.
Tanker SS Antelope Hills slid down the ways on September 17.

(Continued on page 155)





Top, left: Down the ways goes the U.S.S. Tucson, a 6000-ton light cruiser, at the San Francisco yard of Bethlehem. Sponsor, Mrs. Emmett S. Clauch, of Tucson, Arizona.

Top, right: Launching of the U.S.S. Admiral C. F. Hughes at Bethlehem-Alameda Shipyard Inc. Sponsor, Mrs. Otto Nimitz.

Center: Sleek in her battle dress of grey, the tanker Kettleman Hills sailed away from Marinship recently.

Bottom: Mrs. A. F. Carter of Washington, D. C., sends the Navy tanker U.S.S. Soubarissen down the ways at Marinship.

(Continued from page 62)

man of the United States Maritime Commission. This telegram from the White House, was dated September 19, 1944:

" 'IT SEEMS TO ME PARTICULARLY APPROPRIATE THAT VICTORY FLEET DAY THIS YEAR SHOULD HONOR THE MEN AND THE MANAGEMENT OF THE AMERICAN MERCHANT MARINE.

" 'THE OPERATORS IN THIS WAR HAVE WRITTEN ONE OF ITS MOST BRILLIANT CHAPTERS, THEY HAVE DELIVERED THE GOODS WHEN AND WHERE NEEDED, IN EVERY THEATER OF OPERATION AND ACROSS EVERY OCEAN IN THE BIGGEST, THE MOST DIFFICULT AND THE MOST DANGEROUS TRANSPORTATION JOB EVER UNDERTAKEN.

" 'AS TIME GOES ON THERE WILL BE GREATER PUBLIC UNDERSTANDING OF OUR MERCHANT FLEET RECORD DURING THIS WAR THAT I HOPE WILL GIVE IT THE KIND OF SUPPORT, ESPECIALLY FROM SHIPPERS AND PASSENGERS, THAT WILL INSURE THE STRENGTH AND VIGOR IT WILL NEED TO MEET OUR DEFENSE AND FOREIGN TRADE REQUIREMENTS IN THE YEARS TO COME.

VERY SINCERELY YOURS,

FRANKLIN D. ROOSEVELT.' "

Following the reading of the message of President Roosevelt, Mr. Carmody proceeded to cite the various Pacific Coast steamship companies and their managements for meritorious service during the war. Thirty-four companies were mentioned as being given the Maritime Flag. As each company's name was cited the banner was lowered and raised so that all could see it. The presentation list and the representative receiving the citation are shown in the list.

CONSOLIDATED LAUNCHES 106TH SHIP

Consolidated Shipyard at Morris Heights, N. Y., launched the POM-25, sponsored by Mrs. C. A. Dunn, wife of Rear Admiral Dunn, supervisor of shipbuilding, New York. From left to right are Admiral and Mrs. Dunn and William G. Wood, president of the yard.

Victory Fleet Day

(Continued from page 63)

"The shipping companies have met the challenge of war with full patriotism and without fanfare. Theirs has been that type of job taken for granted by the public, if thought of at all, because until very lately "reasons of security" have exerted a complete censorship-ban on practically all news of the merchant marine. Proof of their work is in the worldwide arrivals of ships, bearing needed supplies and material, to our soldiers and our Allies on seven seas.

"What does this strong Merchant Marine mean to America? In the first place, the high standard of living which is traditional with us Americans, in the future will depend largely upon our world trade.

"This means that millions upon millions of American dollars, which have in the past been spent with foreign shipping interests, will go to American shippers, and wages will be paid to American seamen. It means our money will remain in America instead of as in the past, going abroad.

"Of further importance, it means that hundreds of thousands of able-bodied seamen and shipbuilders will have employment—a powerful factor in avoiding post-war depression."

Your Problems Answered

(Continued from page 87)

motor which is geared to the load. A combination of pump and motor is shown in Fig. 8. In this case the pump end is called the A end of the unit and the hydraulic motor end is called the B end of the unit. The electric drive motor at the A end and the load take-off at the B end should be coupled through a flexible coupling to prevent thrust or side pull on either shaft of the hydraulic unit.

The B end of the hydraulic adjustable speed unit is the same as the A end, except that the tilt box is permanently set at an angle of about 20 degrees from the true right-angle position. No oil piping is needed here, as the discharge from the A end passes through the valve port plate which is common to both ends, and the pressure is applied directly to the pistons of the B end. Directions of rotation, speed and torque are therefore subject to very accurate adjustment by position control of the tilt box of the A end of the unit.

This hydraulic motor unit is not usually used for steering, as a large mechanical gear reduction would be needed between it and the tiller. Furthermore, the hydraulic ram offers such a simple means of obtaining the tiller motion that is generally used.

Our next article will discuss means of steering control.

Running LIGHTS

WHO
WHEN
WHERE

Edited by B. H. Boynton

Left to right, standing: Frank Hardy, George Littlejohn, George Williams, Clarence Nelson, Edward T. Senter, Robert Pyke, Arthur Holstein. Seated: D. N. "Bob" Lillevand, Fred L. Doelker, Harry Thompson, Joseph Castellanos, and G. S. Duryea. The latter, a guest of Mr. Doelker, is a representative in San Francisco for the Alaska Steamship Company.

GRACE ASSOCIATES HONOR THE "CHIEF"

The 30th anniversary of Fred L. Doelker, vice president of Grace Line, was celebrated with a luncheon gathering of fellow associates who have been identified with Grace for 20 years or more on the Pacific Coast.

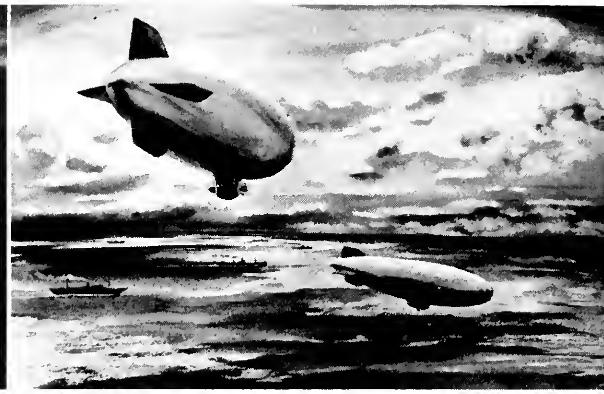
One of the ablest and best known shipping executives in maritime activities, Fred joined Grace in 1916 as a cargo supervisor in the Puget Sound-Columbia River district. Then moved on to the Seattle post opened when George W. Eggers came to the San Francisco headquarters.

In 1917, Fred came to San Francisco to succeed Millen Griffith, and a year later was named sub-manager.

He was appointed Pacific Coast manager for Grace in 1933 and in May, 1940, was promoted to the vice presidency of the Grace Line, a position which he continues to fill in the same capable manner that has characterized his discharge of all his responsibilities.

Fred manages to find time to serve on numerous committees that have to do with the interests of American shipping. He is now President of the Propeller Club of the United States, Port of San Francisco, and has just been named by General Chairman, Hugh Gallagher, to head an important committee for the shipowners and ship operators for Victory Fleet Day.

He is the father of two daughters, Mrs. Louis May, wife of Lieutenant May, USNR; Miss Florence Doelker, and son, Fred Jr., an officer with the Merchant Marine. The family home is 9 Beachwood Drive, Oakland.



Top, left: *THE KILL*

This dramatic sea-sky battle shows a Grumman "Avenger" torpedo bomber, bomb bay doors open after leaving death in its wake as it zooms away from an attack on a surfaced enemy submarine. Bombers were fitted with depth charges, one of which is pictured exploding off the U-boat's beam. In the attack, the plane's rear "stinger" gun spits at gun crews attempting to ward off these lethal hawks from the sky.

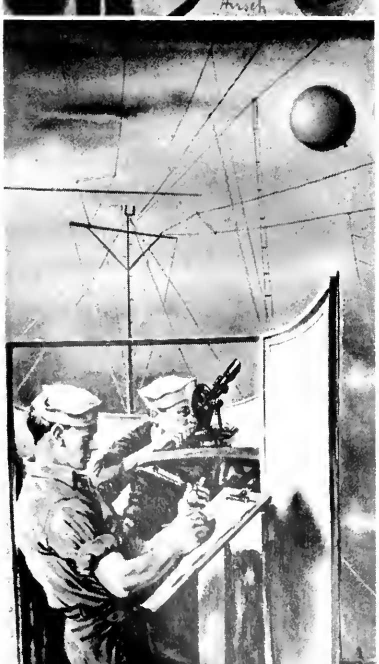
Top, right: *THE CONVOY BROOK*

Like maternal hens, Navy blimps hover over a sea-borne convoy, alert to any danger on the horizon or beneath the surface. Airships are capable of speeds of 60 knots or more, yet can ride indefinitely over danger spots. Their cargo of depth bombs makes them a deadly danger to the submarine. As convoy escorts, the lighter-than-air branch of the Navy has played its part in reopening coastal shipping lanes.

NAVY EXHIBITS AVIATION ART

Center: *FOOD FOR THE "YELLOW PERIL"*

The naval aviation cadet's first serious contact with airplanes is the noted "Yellow Peril," familiarly named because of its color. It is the primary trainer in the Navy's training program. Here a mechanic and a pilot fill up the gas tank.



Lower left: *"SHOOTING" THE WEATHER*

Navy weather men, or aerographers, check a weather balloon with a theodolite. From their findings, they will be able to compute the direction and velocity of the wind, at all altitudes aloft, for preparation of pilots' weather reports.

Over one hundred paintings by seven American artists, commissioned by the Abbott Laboratories show the life of the Navy air arm from pre-flight training through combat action in the Pacific. This exhibition, "Paintings of Naval Aviation," is scheduled to open at the California Palace of the Legion of Honor, Lincoln Park, San Francisco on October 23, to continue through November 15.

NAVY METALSMITH

These men perform miracles of repairs at the advanced bases. They are one group of specialists that operates to keep naval aviation at top efficiency.

The Navy cooperated with the Abbott commissioned artists by making the activities of its air force available to them, by showing them training courses and taking them to sea. These paintings have been given to the Navy, and are to form a part of its permanent War Museum. But already these works are being put to use by the Navy. Reproductions of them appear in induction centers, so that men who are enlisting see them before stating their preference for the branch of the service they wish to join. They are posted in club rooms and class room and on bulletin boards at Naval air stations, and training centers, where they serve as training incentives, and used in recruiting young men of seventeen and eighteen as Naval aviation cadets.

Pre-flight training is painted for the Abbott Collection by Don Freeman, who went to the Naval Training School at Chapel Hill, North Carolina, for his material.

Primary and intermediate training of ground crews and pilots are by Joseph Hirsch and Georges Schreiber, at the Naval Air Station at Pensacola, Florida.

The Naval Air Station at Lakehurst, New Jersey, showing dirigibles in convoy duty, and patrol and training activities, is the subject of the series by Adolph Dehn on lighter-than-air aviation.

Navy airmen in combat operation in the Pacific, against Japanese submarines, planes and warships, are depicted by Robert Benney.

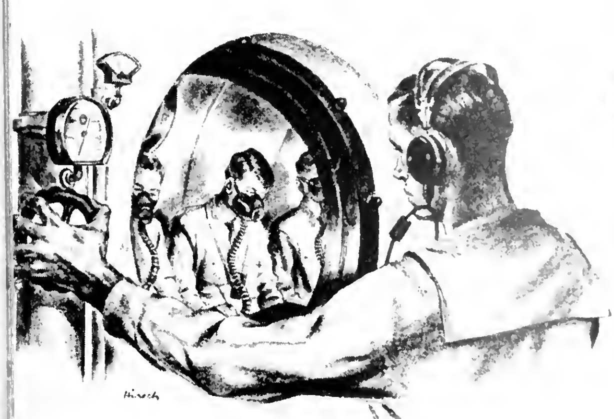
Most of these artists' work are reproduced on these pages. Others exhibiting are: Lawrence Beall Smith on carrier operations at sea; Howard Baer depicts the WAVES activities; 30 photographs by Lieut. Comdr. Edward Stiechen.

Top, right: ***INTO THE RIGGING***

Blimp maintenance crews need a lot of the same agility aloft required of sailing men in the days of windjammers. Navy crews periodically go over the big air ships from engine to gas cells, scan the outer surface of a blimp envelope for rents or rips, in a hunt for signs of stress or wear.

Right: ***SIGNALMAN ON FLAT-TOP***

Aboard an aircraft carrier, the signalman is always on the alert to bring in the homeward bound sky-fighters.



Lower left: ***LEARNING THEIR ALTITUDE ROPES***

This drawing shows the men, in the low pressure chamber at training school, getting their first experience with the tricks which a lack of oxygen can play on the human system. Here they ascend to 25,000 feet under the watchful eye of a pharmacist's mate.

Lower right: ***THE "UP-CHECK"***

The lift of the instructor's thumb in the gesture of success is a fateful moment for every aviation cadet. The "up-check" marks another milepost on the road to Navy Wings of Gold.

Victory Fleet Day

IN SAN FRANCISCO AND LOS ANGELES

Tribute Paid Steamship Operators

The appreciation of the commanders-in-chief of the Army and Navy, for services rendered by the steamship operators, is exemplified in a radiogram sent by Admiral C. W. Nimitz to Hugh Gallagher, vice president of Matson Navigation Company, who served as general chairman for Victory Fleet Day in San Francisco, which was designated by Admiral Land this year as a tribute to the American Line Companies.

> The telegram:
>
> **"The sea lanes of the Pacific, which have been extended westward more than 4000 miles in the last year, are crowded with merchant ships supporting our offensive against Japan. Without these ships, which have been wholly devoted to winning the war by the American maritime industry, our substantial progress would not have been possible.**
>
> **"This war has fully confirmed the necessity for a strong and sound merchant marine to be maintained in time of peace so that it may be employed as an auxiliary of the Army and Navy in time of war. The convincing way in which this fundamental fact has been demonstrated in the Pacific is a tribute to the ability and patriotism of the American Merchant Marine and augurs well for its future."**

Ceremonies for Victory Fleet Day were held in all Pacific Coast port cities as part of the national observance to the steamship operators. Line executives in the various ports handled all arrangements along with ranking Army, Navy, Marine, Coast Guard and Maritime officials in attendance.

Hugh Gallagher
Vice President of Matson, was general chairman for Victory Fleet Day in San Francisco.

V.F.D. at Los Angeles-Long Beach

September meeting of the Los Angeles-Long Beach Propellers featured "Victory Fleet Day" and was held at the Biltmore Hotel, September 27. This was the first meet under the baton of their new president, Lee K. Vermille of Overton, Lyman & Plumb.

High light of the day was the address by guest speaker, Charles A. Dostal, vice president of Westinghouse of San Francisco. And, as a special feature on the program, the American Flag Lines and General Agencies were presented with a citation from the War Shipping Administration for their outstanding performance. In charge of this feature was Stafford S. Harlow, assistant Pacific Coast Director of the War Shipping Administration.

During the early part of the month the Los Angeles Propellers were honored with a visit from Arthur M. Tode, Honorary President of the Propeller Club of the United States. Mr. Tode was accompanied by his charming wife, who sponsored the SS St. Mary's, launched at Calship. During the luncheon tendered to Mr. Tode at the University Club, Los Angeles, by the officers and directors of the club, he spoke briefly of the importance of the Merchant Marine Conference and Annual Meeting of the Propeller Club of the United States in its relation to our post-war period. He also announced that very possibly there will be a 94th Unit in the National chain of Ports, San Diego.

USMS Center Dedicated in S. F.

The USMS Center in San Francisco was officially dedicated as part of the celebration planned on Victory Fleet Day.

The building was first leased in March, 1943, and occupied on April 8, 1943, by a group of officers and men from the Alameda Officers School.

The building is the hub of all Maritime Service units in the Pacific Area, now under the command of Captain H. J. Tiedemann, USMS, Pacific District Operations Officer.

The Center is the location for USMS officers and includes Disbursing Office, Grade Station, Up-Grading and special instructional schools, Public Relations and the Enrolling Office.

Quartered on the second and third floors of the Center are seamen from all the USMS training schools awaiting orders which will place them aboard merchant vessels at a moment's notice. Approximately 1300 men per month are assigned to duty out of the Center, with a likely increase to 2000 per month in the near future.

At the present time approximately 15,000 men have passed through the enrolling office in this Center. These include men with no previous sea experience who have signed up for training at Catalina Island, and enrollees for the Signal School, Up-Grading Courses, Barrage Balloon School, High Pressure Turbine School, Turbo-Electric School, Cooks and Bakers Schools and Able-Bodied Seamen Up-Grading School.

Captain Crossman of Alameda Officers School

Congratulations were in order on the morning of September 16, with the announcement of the advancement of USMS Alameda Officers School superintendent from the rank of Commander to Captain.

The Pacific Marine Review extends cheers and best wishes to Captain M. E. Crossman, USMS. Also, congratulations to Captain A. G. Ford, US MS, superintendent at the U. S. Maritime Service Officers School, Fort Trumbull, Conn., former superintendent of the Alameda station. Our readers no doubt remember the good work Captain Ford did out here on the Coast.

Louis Ets-Hokin

William C. Rodgers

Top: James M. Wright. Center: Milo F. King. Bottom: Milton Schug of Southern California branch.

PUTTING IN WIRES AND PUTTING OUT FIRES

Twenty-five years ago, Ets-Hokin & Galvan of San Francisco started as a two-man outfit, installing electric systems on boats.

Louis Ets-Hokin, head of the firm, attributes his start in business thus: "I am a bad sailor. After graduating from Cornell I wanted to go to sea, so I went through Annapolis and became a lieutenant on a submarine. So to sea I went. But—— the sea would have none of me!"

Turning to the shore, he started doing engine wiring in a few small pleasure cruisers, and now, among other things, he has installed radar in battle cruisers. Today there are approximately 500 men and women on the payroll, and the firm recently moved into greatly enlarged quarters at 551 Mission Street, from which it is installing on board ships complete electrical equipment and C-O-Two extinguishing systems.

In the early days a few risks had to be taken. Some of the old hands in the firm still grow cold when they remember a fire apparatus demonstration in 1927. In order to demonstrate the efficiency of the then new C-O-Two system, Louis persuaded an Oakland firm to lend him a room which he would set on fire with 20 gallons of gasoline, then put the fire out with C-O-Two.

A young man, Jim Wright, now in charge of the C-O-Two Department, helped by his brother Mike (also connected with this firm), set up the fixtures. The fire chiefs came bringing along a hose and ladder company. Meanwhile the insurance people heard about it and excitedly got off the risk. When the time came, Louis lit a match and looked around. If anything went wrong, his shoestring business would go up in smoke, literally. After a moment's hesitation he tossed the match, which ignited the room, but in 27 seconds the fire was automatically out.

The key men in this firm are all employees of long standing. In charge of all activities in Southern California is the very capable Milton Schug. Then there is Milo F. King, now general superintendent in charge of operations in Northern California. Associated also is Bill Rodgers, the doyen of all purchasing agents, of whom men say that if you cabled him from Rabaul asking for a gyro-compass, he would cable back the address of a Chinaman living three doors from your hotel, who had one for sale.

Port of San Francisco Second Annual

AND REPORTS OF THE

Above, left: Commander C. W. Peet, Jr., Hugh Gallagher and prexy Fred Doelker.

Below: Exec Table, the Committee: Martin, Lillevand, DeRochie, Swett; (seated) Hoffman, LeCount, and Reeves.

The Lakeside Country Club was the colorful setting of the second annual golf tournament of the Propeller Club, Port of San Francisco, where fourscore stalwart turf tossers vied for honors on Friday afternoon, September 15.

Champion golfer of the Port of San Francisco for 1944 is Harry T. Haviside, who was awarded the custody of the perpetual trophy, in addition to a very handsome prize.

Fred L. Doelker, the president, turned in a triumphant card and did the honors at the festive banquet, which was spread in true Joe Robinson fashion, in the Country Club's cozy dining room.

D.M. "Bob" Lillevand again served as chairman of the event. His associate committeemen were: W. Edgar Martin, C. M. Le Count, Bern De Rochie, George E. Swett and Joe Robinson. This foursome was aided and abetted by Carroll Reeves, the Club's House Committee chairman.

Other lucky golfers were: Trev Smith, John Clerico, B. L. Haviside, J. E. Peggs, Wm. Warren, S. Livingston, Hugh Gallagher, Joe Robinson and E. H. Harms.

There was a brilliant turnout of special guests from the U. S. Navy and the Maritime Commission, with awards for guest flight honors ably distributed.

The perpetual trophy which will now be inscribed with the name of H. T. Haviside, was donated by Al Nolan of the P. L. Transportation Company. Last year the trophy honors were won jointly by Stuart Mudge and Frank O'Connor.

An array of 37 prizes bedazzled the lucky golfers and a generous allotment of gate ticket holders. Awarding of the prizes was conducted by Bern DeRochie in his usual histrionic style and much applause greeted the announcement of the names of these prize donors:

Prize Donors

George Armes, General Engineering & Dry Dock; Allied Products Co.; Challenge Butter; Dohrmann Hotel Supply; Bill Empey, The Guide; Fairbanks-Morse, Roger Murray; The Grace Line, Bob Lillevand; John Greany, Bethlehem; C. J. Hendry Co., Charlie Dilke; The Log; Harry Haviside, H. T. Haviside Co.; Marine Electric Co.; C. W. Marwedel Co.; Joe Moore, Moore Dry Dock; O'Brien, Sportono & Mitchell; Frank O'Connor, Donovan Lumber; Harry Parsons, Parsons Engineering; Pacific Marine Review; Poultry Producers; Tom Short, T. A. Short Co.; Bob Spear, Foster-Wheeler; Schweitzer & Co.; L. T. Snow & Company; Standard Distributors; Capt. James Swett, United States Marine Corps; Sussman, Wormser & Co.; Sunset Produce; Tiedemann & McMorron; Tubbs Cordage, Herman Nichols; Weeks-Howe-Emerson.

First Meet of the Fall

The first Fall meeting of the Port of San Francisco was filled to overflowing, when members and business representatives of most of the airlines gathered to hear Jack Frye, president of Transcontinental and Western Air, speak on the tie-in between the Airlines and Shipping.

Mr. Frye said that the airlines expect to get 80 per cent of the prewar steamship passenger business, but that the operation would create new business to offset the steamship loss, and that it would be a net gain rather than loss. Added to this will be the enormous increase in cargo business created by the airlines opening up new trade territories.

Several concrete suggestions were offered to the steamship people:

(1) Emphasis on the surface lines' advantage to cheapness of transportation which advantage should be developed whenever possible.

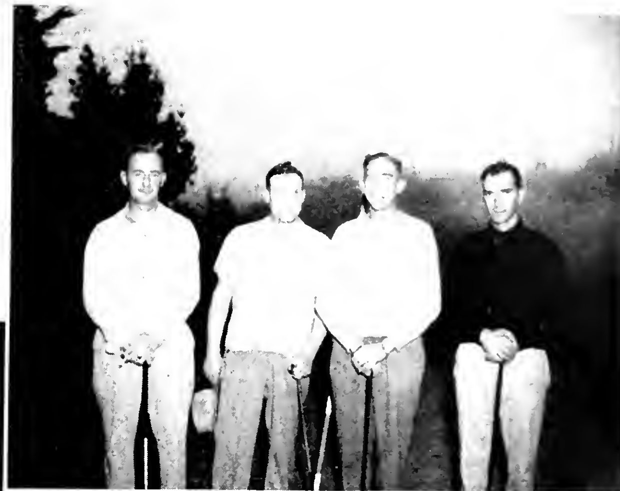
(2) The steamship lines' attempt to serve raw material sources by reaching, either directly or by subsidiary operation, the river business of China and Brazil, among others.

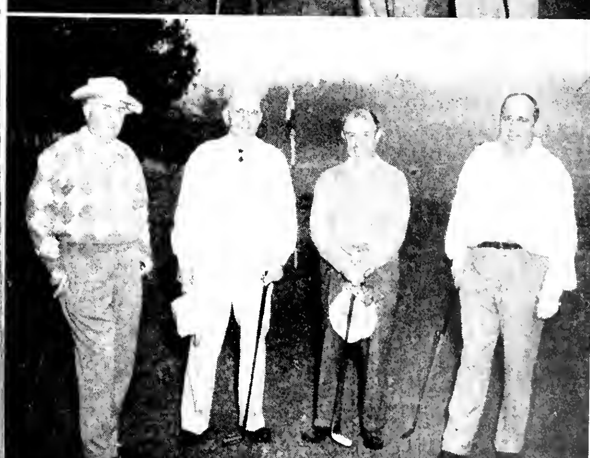
(3) That inland operation be expanded in foreign countries and that commercial activities in the interiors of all countries be promoted rather than confined to port cities.

Mr. Frye, although young in years, is a pioneer air operator, who has risen to the top of one of the country's major business concerns. He believes that the air and surface lines have much in common and that they can work together. As a member of the Propeller Club he will promote such cooperation.

Propeller's Golf Tourney

VARIOUS PORTS' MEETINGS





Champ for '44 is Harry T. Haviside. Pressing him for honors were: Trev Smith, John Clerico, B. L. Haviside, J. E. Peggs, Wm. Warren, S. Livingston, Hugh Gallagher, Joe Robinson and E. H. Harms.

Propellers at Various Ports

Propeller's Port at Panama Canal

All of the American marine industry will be interested to learn that another unit has joined the National Organization. Unit 93, Port of Panama, was granted a Charter on June 16.

Formal organization followed explanatory meetings held by members of the U. S. Navy, Steamship interests, and Panama Canal employees. Captain Myles P. Duval, USN, Port Captain at Balboa was director of the organization, along with E. W. Hatchett, president of the Propeller Club, Port of Balboa College; Captain Hans Schloming, veteran Canal Pilot; and David J. Pearsall, Vice Consul, American Embassy at Balboa.

Photo glimpses of the San Francisco Propeller golfers at the delectable get-together at Lakeside Country Club, September 15.

Center figure is Byron "Tote" Haviside, who toted home the bacon for his Sire.

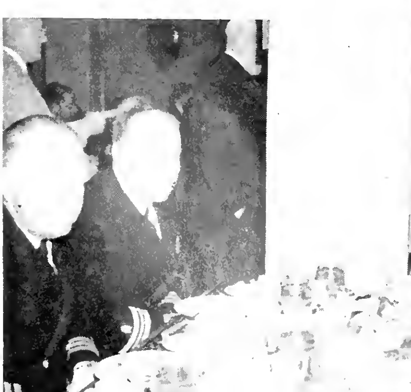
Northwest Propeller Program

Seattle Propeller Club members recently visited the Everett Pacific Co., at Everett, Washington, where they toured the modern facilities of the organization as guests of Ferdinand Schmitz, Jr., president of the company.

Mort Carraher, personnel director for the company, conducted the yard tour, which included inspection of machine tools and a vast amount of new equipment recently installed to make the yard one of the most modern construction plants on the coast.

At the dinner meeting Mr. Schmitz outlined the history of the firm and introduced Barkley Knerr, general superintendent, who explained the facilities in detail and listed the work already completed.

During the first six months of this year approximately 4700 seamen and officers were repatriated from overseas to United States ports. Since the beginning of the war, more than 15,000 American seamen and officers have been returned from foreign ports to this country, according to the WSA in charge of this transportation.



An Enemy Convoy...

a British Sub...

and the Faithful "Sperry"

ABOUT FOUR BELLS of a moonlit morning in January, 1943, a British submarine lurked off the north coast of Sicily, waiting for enemy supply ships. It hadn't long to wait!

An enemy convoy steamed into sight. The submarine submerged and closed in for the kill at full speed. Suddenly the biggest supply ship in the convoy swerved directly toward the submarine, carrying out an unexpected zigzag. Head on she came—and crash! The sharp stem of the big ship cut through the sub's bridge and superstructure, carrying away both periscopes.

The submarine was not mortally hurt. But she was blind, and the magnetic compass was smashed. The skipper glanced at his "Sperry"—that's British for Gyro-Compass—and found it still running. His base lay 500 miles away through dangerous enemy waters. He set forth, steering by Gyro-Compass, navigating entirely by dead reckoning—blind by day when submerged, and on the surface at night. Bad weather prevented observations of the stars . . .

As the skipper told it to us later, after five and one half days with only the tick-tick of the "Sperry" for comfort, they made their landfall off Algiers—*one mile out of position, and 5 minutes late on schedule.*

And thus a famous British submarine, with a record of many enemy ships sunk, was spared to fight again.

Sperry Gyroscope Company INC.

GREAT NECK, N. Y. DIVISION OF THE SPERRY CORPORATION

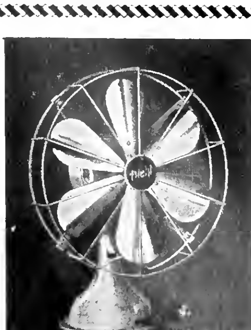
YROSCOPICS • ELECTRONICS • AUTOMATIC COMPUTATION • SERVO-MECHANISMS

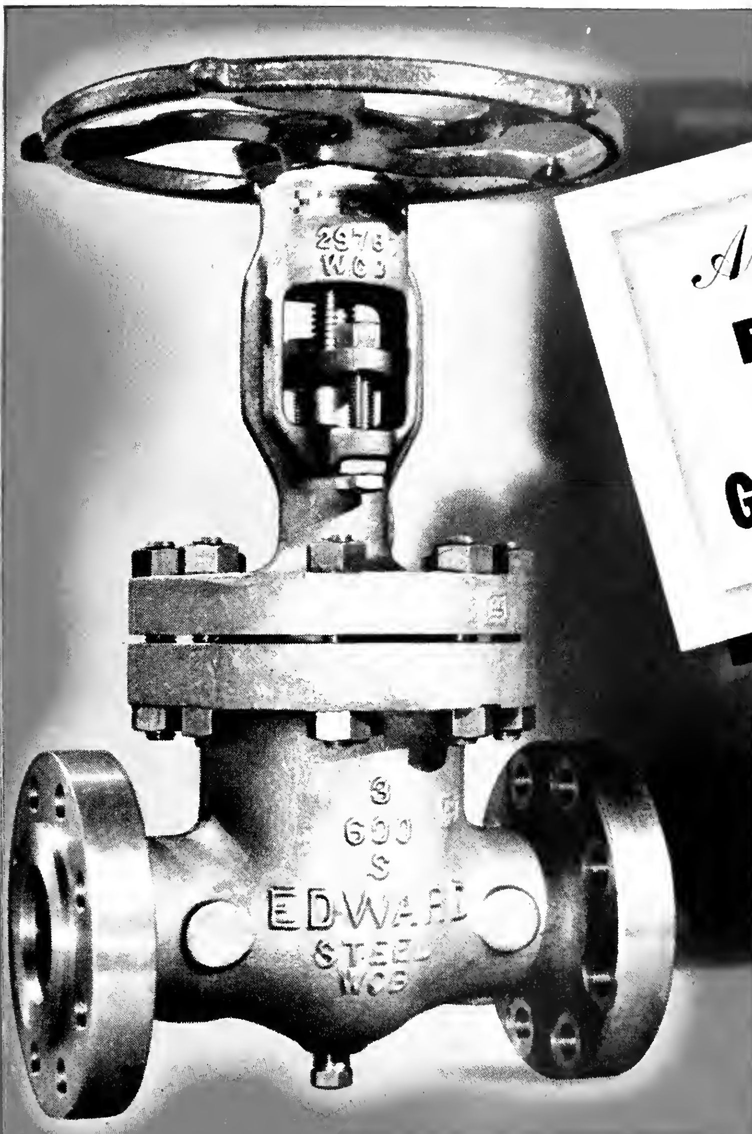
E. E. LeVan, new president of Haynes Stellite Company, a unit of Union Carbide and Carbon Corporation. He succeeds the late Francis P. Gormely.

James S. Rose, manager of San Francisco office of Ilg Ventilating Company.

Ilg Expands in San Francisco

For quicker and more efficient handling of the ventilation business on the West Coast, Ilg Electric Ventilating Co. has moved its San Francisco branch office to larger headquarters at 826 Sharon Building, 55 New Montgomery Street. To manage this new office Ilg has secured the services of James S. Rose, formerly Supervisory Methods engineer in charge of heating and ventilation, Curtiss-Wright Company, Buffalo, New York.





Announcing
EDWARD CAST STEEL GATE VALVES

Now

YOUR POST-WAR GATE VALVE IS READY . . . !

HERE is a valve that *is* tighter and *stays* tighter than you thought a gate valve could—a post-war valve development ready *now!*

Forty years a producer of steel valves for difficult operating conditions, Edward is now building cast steel gate valves for the first time. These valves are available in many sizes and pressure classes for *immediate shipment!*

Flow is straight through and unobstructed, yet globe valve tightness is achieved through fundamental differences in design. Specially developed testing methods prevent any Edward gate valve passing test unless *both* faces, *not just one,* are absolutely drop tight *simultaneously*.

NEW CATALOG READY

Just off the press! Catalog 12-E1 with illustrations, dimensions and descriptions of Edward cast steel gate valves for 150 to 3600 lb service. Write for your copy.

✓ *Check These*

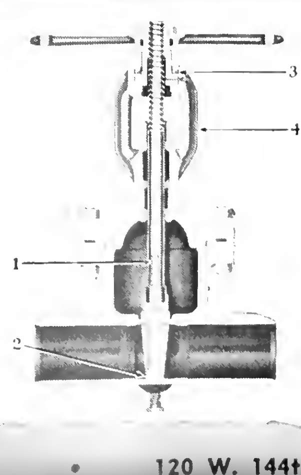
UNUSUAL FEATURES

1 Close fitting wedge guides welded to body *after* seat rings and wedge are located to assure perfect alignment and eliminate unnecessary wear-producing drag of wedge across seating faces.

2 Perfectly positioned hard surfaced seats, integral with body.

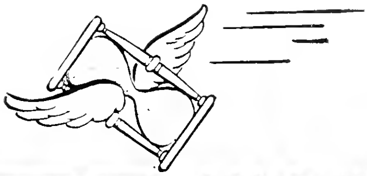
3 Simple yoke construction with ball bearing operation even in medium sizes, EValized surfaces where abrasion is a problem, and no superfluous parts.

4 One piece bonnet for absolute alignment, easy operation, minimized maintenance.



THE EDWARD VALVE & MFG. CO. • 120 W. 144th Street • East Chicago, Indiana

EDWARD *Steel* VALVES



"That's what I

BILGERS AHOY!!

The annual Fall Banquet comes off on October 27, at Pacific Coast Club in Long Beach. Plan to attend!

Papers Filed

With an authorized capital of $500,000, incorporation papers are on file at Sacramento by the Olson Steamship and Navigation Corporation with the name of Vincent Harris Olson and Associates of Pasadena as the incorporators.

The application said that the authorized stock will be increased to $10,000,000. The home office is to be Los Angeles, with services in San Francisco, Portland, Grays Harbor, Seattle, Vancouver, B. C., and trans-Pacific to China, Philippines, Dutch East Indies, Hawaii and Japan. Mexico, Central and South America are ports also scheduled for calls.

Application has been made to the ICC for an East and West bound intercoastal certificate. It is proposed at first to use chartered ships; eventually suitable passenger and cargo vessels will be purchased from the Maritime Commission.

Fairbanks, Morse & Co. Buys Pomona Pump

Fairbanks, Morse & Co. has purchased the Pomona Pump Company a division of Joshua Hendy Iron Works in a $4,000,000 transaction.

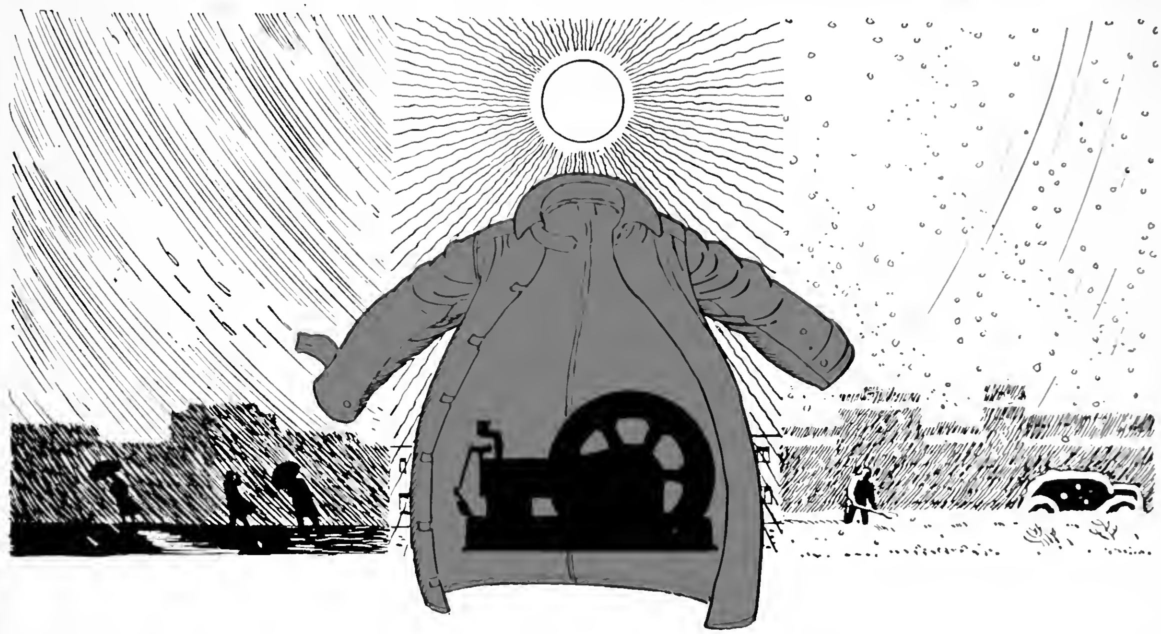
Announcements of the sale were made simultaneously in Chicago by R. H. Morse, Jr., general sales manager for F. M., and in Sunnyvale, California, by Charles E. Moore, president of Joshua Hendy. The sale was effective as of September 2.

No changes in personnel are contemplated and, according to Morse Arnold G. Brown, general sales manager of the company, becomes assistant manager of the Fairbanks Morse Pump Division in charge of Pomona and Westco products. Distribution and sales will continue under Brown's direction.

Morse pointed out that acquisition of Pomona will augment the Fairbanks-Morse line of pumps, and that this is an addition to the pumps now being manufactured.

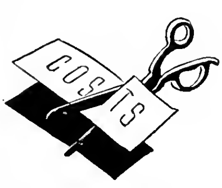
Hereafter the Pomona pumps will be known as Fairbanks-Morse-Pomona, and Fairbanks-Morse-Westco line.

Weatherproof your equipment <u>now</u> with this revolutionary "postwar" product!



Where weatherproofing of equipment is concerned, your "postwar" product is available now!

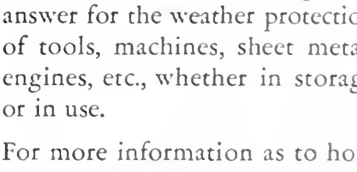
This product—known as Stop Rust D1—is a rust preventive, compounded to give the maximum exterior protection under the most severe conditions of sun, wind, rain, hail or snow.



Stop Rust D1 comes in liquid form and dries quickly to a hard, tenacious film on application. It requires no special equipment to use. You can apply it like paint—with a brush, spray, cloth, or use it as a dip coating. It will not run when applied to walls or other vertical surfaces. Stop Rust D1 is economical. A light coat is effective; one gallon covers many square feet.

When coated with Stop Rust D1, equipment is sealed against rust and dirt. Parts treated with Stop Rust D1 may be handled without damage to the coating. Extremes of temperature do not affect it. Stop Rust D1 has a high dielectric strength and will not cause current leakage. It does not interfere with the use of equipment or material treated with it, but, if desired, it may be swiftly removed with ordinary kerosene.

Many contractors and maintenance superintendents have found Stop Rust D1 to be the almost perfect answer for the weather protection of tools, machines, sheet metal, engines, etc., whether in storage or in use.



For more information as to how this sensational product can cheaply and quickly weatherproof your equipment—or to have a supply delivered—simply phone your local Union Oil Company agent.

Left: Seated at the head table, left to right: Mesdames Allan Toole, Frank Short, J. A. McKeown, E. N. Babb, Arthur M. Tode, Paul Cronk, chairman of the day; Earle H. Carder, Harry Parsons, Philip Roach, and David Porter.

Below: Arthur M. Tade praising the new club's organizational achievements. Included in the picture are Mrs. Tode and Mrs. Earle H. Carder.

PORT OF SAN FRANCISCO WOMEN'S GROUP
FETES EASTERN VISITOR

At the Army-Navy Club in San Francisco on September 8, an impromptu luncheon for Mrs. Arthur M. Tode, wife of the Honorary President of the Propeller Club of the United States, was tendered by the members of the Women's Organization for the American Merchant Marine.

During the luncheon, Mrs. Tode spoke to members and guests of the splendid progress being made by this club, offering few suggestions on future activities, especially the education of the youth in the interest of the merchant marine. Mrs. Tode is a very active member in the Eastern organization, which contributed much to the inauguration of this Pacific Coast unit.

Several guests at the luncheon were associates of the Eastern group. They were: Mrs. James Bruemullen of Baltimore, Maryland, and Mrs. Gailhouse of New York.

Arthur M. Tode dropped in to congratulate the women on the efficient handling of their organization and their place in the future. Other guests to praise the new club were Captain Blackstone, Harry Parsons, Edward Harms, and Bern De Rochie.

ARMY GENERAL TAKES THE HELM

Major General L. H. Campbell Jr., chief of ordnance of the Army, takes his turn at the wheel of the Ingalls Sea Mule, while on an inspection tour of the Pascagoula shipyard. A. M. Swigert, works manager, explains the all-welded tug's hydraulic steering.

Alaska-Pacific Appointed Hendy Diesel Agent

Appointment of the Alaska-Pacific Supply Company, 64 Marion Street, Seattle, Washington, as agent for Hendy marine and stationary diesel engines and parts is announced by the Joshua Hendy Iron Works, Sunnyvale, California.

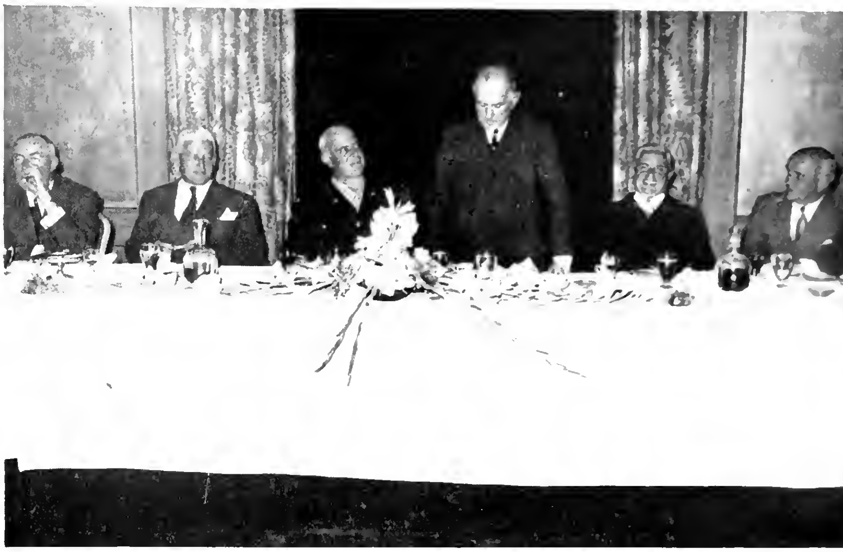
Exclusive territory of Alaska-Pacific is the state of Washington for stationary and marine diesels, the Oregon coast and Columbia river for marine engines, and Alaska for stationary, marine, and generator units to be used in all commercial vessels and canneries.

Established in 1939, Alaska-Pacific has Leon F. Sutter as president and manager and C. Fain Sutter as secretary-treasurer. Included on the sales force is Ray Johnson, who for 1[illegible] years was associated with the Johnson Manufacturing Company of Seattle. The firm specializes in engine and engine-room supplies, and is prepared to make complete installations supplying full service through its service organization.

Matson Australian Agent Honored

Frazer A Bailey, executive vice president of Matson Line and director, South and Southwest Pacific Division of the War Shipping Administration, recently gave an informal dinner in the Green Room of the St. Francis Hotel, in San Francisco, in honor of Charles E. Brown, formerly Managing Agent of the company for Australasia, and now regional director of the War Shipping Administration for the South Pacific and Southwest Pacific Areas. Included at the head table were: Mr. Bailey, Mr. Brown; Ralph J. Chandler, Southern California manager; George G. Montgomery, director; George K. Nichols, vice president; Colonel Thomas Plant, U. S. Army; J. W. Speyer, director; and Sydney G. Walton, vice president.

Among the guests were representatives of the War Shipping Administration and the department heads of the Matson Line.



Left to right: Ralph J. Chandler, J. W. Speyer, Colonel Thomas Plant, Charles E. Brown, Frazer A. Bailey, and George K. Nichols.

Goes to Honolulu

J. A. McDonald, assistant port engineer of the General Petroleum Corporation of California at Los Angeles has gone to Honolulu as expediter of tankers. He was selected by the Tanker industry to do this work.

New President of Socony

B. Brewster Jennings has been elected president and chairman of the executive committee of Socony Vacuum Oil Co., Inc., succeeding the late John A. Brown.

The position of chairman of the board, which has been vacant since 1935 will now be occupied by the vice president Harold F. Sheets.

Mr. Jennings has had twenty-four years of experience in many departments of the oil business.

He was appointed assistant to the president in 1936, and was elected to the board of directors in 1937.

Mr. Sheets has been vice president since 1932, in charge of foreign trade, and has spent 17 years abroad. He joined the company 37 years ago.

Appointment

Tube Turns, Inc., Louisville, Kentucky, annnounces the appointment of Ches Herndon as manager of the company's Houston branch with offices in the Commerce Building. A native of St. Louis, Herndon's associations with supply firms in the Southwest dates from 1926. He was with Hanlon Waters, Inc., in Tulsa for 13 years.

VISIT TO MOFFETT FIELD

Officers at Moffett Field and their guests, the Naval Affairs Committees of the Chambers of Commerce of San Francisco Bay cities, at Moffett Field, Sunnyvale, California, on September 8th.

Estimated Supplies to Europe

Based on estimates of the Roth-Leith committee, a total of approximately 10,000,000 tons deadweight of shipping will be required to handle the important relief foodstuffs, clothing and materials to France, Belgium and Holland when the two latter nations are liberated.

Headquarters in Australia

Howard S. Zumalt, formerly with the States Line in the Orient, cabled friends that he is now representing the War Shipping Administration, as port representative in Australia, with headquarters in Sydney.

First Pacific Coast Director U. S. Steel

Following the regular monthly meeting of the Board of Directors of U. S. Steel Corporation, Irving S. Olds, chairman, announced that James B. Black, of San Francisco, has been elected a director of the corporation to fill the vacancy on the Board created by the death earlier this year of William J. Filbert. Mr. Black thus becomes the first Pacific Coast director.

Mr. Black is president of Pacific Gas and Electric Company, San Francisco, and is prominent in Pacific Coast civic, philanthropic and industrial affairs. He is a director and member of the Executive Committee of the Southern Pacific Company and also is a director of the Equitable Life Assurance Society, Fireman's Fund Insurance Company, Del Monte Properties Company and California Pacific Title Insurance Company.

He was graduated from the University of California in 1912, and his entire business career, with the exception of nine years in New York City as Vice President of the North American Company, has been spent in California. His election adds to the membership of the Board of Directors of U. S. Steel a representative of the rapidly expanding western industrial area served by the corporation.

Columbia Steel Company, the corporation's West Coast subsidiary, has steel producing plants at Pittsburg and Torrance, California. In addition to Columbia, which was founded in 1910 and became a U. S. Steel subsidiary in 1930, the firm's operations in the West include the Boyle Manufacturing Division of U. S. Steel Products Company with plants at Alameda and Los Angeles, and the Government's new $200,000,000 Geneva, Utah, works built and now being operated for the Government by U. S. Steel without profit for the duration of the war emergency.

Shoreside Personalities

Forty-five years at sea, of which 26 years as master with the Matson Navigation Company, is the record being observed this month by **Captain Fred Hamma,** one of the most respected and widely-known shipmasters to sail out of a Pacific port.

He is a native of San Francisco, born July 22, 1877. He has been serving in this war as master of the SS Maliko. He is best remembered, however, when he was skipper with the Los Angeles Steamship Company's liner Harvard, later as commodore of the fleet aboard the City of Los Angeles, when this concern operated to Hawaii, before the firm was taken over by Matson.

In 1910 as an AB, Captain Hamma made his first trip on the old Umatilla. He served on the Queen, Spokane, the old Santa Rosa, State of California, the old Pacific Mail liner, City of Peking, the Hanalei. On the latter he was ultimately master. During the first world war he was master of numerous Shipping Board vessels.

Friends who desire to write **Commander Leb Curtiss,** formerly of the maritime firm of Pillsbury & Curtiss of San Francisco, can address him thus: Commander Leb Curtiss, USNR, Staff Service Force, U. S. Pacific Fleet, Fleet Post Office, San Francisco.

Commander Curtiss has been in the South Pacific for some time and is soon expected to leave for Washington, D. C. However, he does not expect to remain there by a few weeks before returning to the Southwest Pacific.

George E. Costello has been named general agent in New York for the Canadian Pacific Steamships Ltd., succeeding Ernest T. Stebbings, who has retired under the pension rule's 8 years' service.

Mr. Costello is widely known in transpacific shipping. He was stationed for many years in Hongkong and was repatriated in 1943 after spending 21 months in a Jap prison camp.

Mr. Stebbins joined the Canadian Pacific in 1916 and has been in the New York office for 28 years.

Piloted First Victory 'Round the World

To Captain Leonard Duks, San Francisco, went the honor of piloting the SS Poland Victory, first of this type ship to circle the world. He reported the vessel behaved magnificently in all kinds of weather. While the ship pitched considerably in bad weather; the flare of the hull is such that heavy seas are thrown off and only spray comes topside. Engineers said that this vessel had little or no vibration and the rolling was negligible. She was built by Oregon Shipbuilding Corporation, Portland, Oregon.

George Zeh, retired marine manager, Tide Water Associated Oil Company, San Francisco.

Retires from Tide Water Associated

George Zeh, a nationally known figure and manager of the marine department of Tide Water Associated Oil Company for 17 years, retired from active participation in marine affairs on his 66th birthday. His retirement also marks exactly the end of his 42nd year with the company.

He served on a number of committees for the American Petroleum Institute and was also a director of the American Bureau of Shipping and vice president of the Pacific American Tankship Association.

To wish him well and to pay tribute to the good fellowship they had enjoyed, friends and associates in the Pacific American Tankship Association gathered recently at a banquet in his honor.

Tide Water associates also feted Mr. Zeh before he left the company at a luncheon in his honor at the Bohemian Club, San Francisco. The group arranged to secure for Mr. Zeh certain fine tools with which he can pursue his hobby of cabinet-making and inlay work.

Oily Promotions

H. S. Chase and Drew L. Hines have been appointed vice presidents of Tide Water Associated Oil Company and Richmond K. Kelly has been appointed assistant vice president, according to an announcement made by William F. Humphrey, president.

Mr. Chase has had more than 22 years of service with the company in refining operations. He will continue in charge of manufacturing in the company's Eastern Division. Until early last year he was general superintendent of the company's refinery at Bayonne, New Jersey.

Mr. Hines has had more than 21 years of service with the company in engineering, construction and transportation operations. He will continue in charge of transportation and supplies in the company's Eastern Division. Until last May, he was assistant manager of transportation of the company's Western Division.

Mr. Kelly has had more than 15 years of service with the company in connection with its Eastern Division marine transportation operations. He will continue to have charge of the company's Eastern Division Marine Department.

A. J. SBAROUNIS (top), general manager of the Greek Ministry of Finance and permanent Undersecretary of the Treasury in the Greek Government, is shown on a recent visit to Marinship, Sausalito, tanker yard, with his son, John Sbarounis. While on tour he was impressed by American welding techniques and subassembly methods in shipbuilding. He confessed he thought the U. S. news broadcasts in Athens about ship production figures were exaggerated for propaganda purposes, but after visits to Calship and Marinship he now understands why such seemingly impossible feats are considered routine.

John J. Dement Passes

John J. Dement, former vice president of Erie Basin Dry Docks, Inc., now Todd Shipyards Corporation's Brooklyn division, died recently in Long Island College Hospital, Brooklyn, New York. He was 66 years old.

Mr. Dement began his career in ship repairing in 1894 as a riveter passer in the Robins Dry Dock and Repair Company, Brooklyn. He was appointed superintendent of the Robins plant in 1917. In March, 1939, he was elected a vice president of the company, which had absorbed the Robins plant. He retired in 1943.

As superintendent of Robins, he supervised the cutting in two of the William McKenny to make it forty feet longer. The task set a precedent in ship repairing.

In S. F. for Victory Fleet Day

Captain H. H. Dreany, USMS assistant commandant of the U. S. Maritime Service, was in San Francisco from Washington, D. C., to attend the dedication of the Victory Fleet Day exercises of the new Maritime Service Center, 1000 Geary Street.

Left to right: F. H. Searight, San Francisco district sales manager, and Frank C. Angle, manager of sales in the Pacific Region, Allis-Chalmers.

Allis-Chalmers Appointments

Frank C. Angle, manager of Allis-Chalmers sales activities in the Pacific Region, has just been appointed manager of all the company's field sales offices of the General Machinery Division and their operations, according to an announcement by W. C. Johnson, vice president. He will continue to supervise operations of the Pacific Region.

Mr. Angle was appointed manager of the Pacific Region in 1943 and placed in charge of all Allis-Chalmers sales and engineering facilities serving industries in the Pacific Coast area. Prior to this he had been manager of the Allis-Chalmers San Francisco district office for seven years.

Announcement of the appointment of **F. Harvey Searight** to the position of district manager of the San Francisco District of the Allis-Chalmers Manufacturing Company. He has been serving in the capacity of acting district manager in the past year.

Mr. Searight entered the employ of the company in 1911, having already had a very rich background with Chas. C. Moore and Company engineers, The American Smelting and Refining Company, and the Southern Pacific Company in the San Francisco area. He has served since 1911 in the San Francisco Sales and Engineering Office of Allis-Chalmers.

Since the 1906 fire, Mr. Searight has worked with and had a very definite part in the building of the San Francisco industrial centers. Some of his earlier adventures included a very active participation in the designing, building and testing of the old Fruitvale Power Plant and Substations for the Oakland-Alameda and Berkeley Steam Railway electrification.

In Civilian Life Again

Don Watson is back from Washington, where he was released from the Navy as a Lieutenant Commander while serving as aide to Edward J. Stettinus Jr., present Under Secretary of State.

He has located in Seattle and is in charge of the Pacific Coast Maritime Industry Board under Chairman Captain Paul Eliel.

Carswell to Represent Lombard on West Coast

The San Francisco office of Carswell Marine Associates, Inc., has been appointed exclusive representative on the West Coast for the Lombard Governor Corporation of Ashland, Mass., designers and builders of precision hydraulic equipment.

The concern has been known throughout the world for over 50 years as a producer of the highest quality equipment, including relief valves, pumps, and governors. Its achievements in this field were officially recognized early in the war when the company was awarded the coveted Army-Navy "E" for meeting exacting wartime standards and giving "on-time" delivery of relief valves for submarines.

Announcement of the new tie-up with Carswell was made by Frank A. Hart, vice president and general sales manager of the firm.

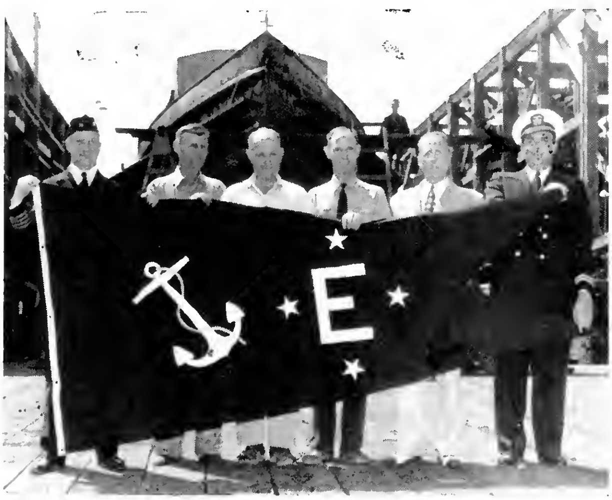
Carswell Marine Associates, Inc., has its Western headquarters at 417 Market St., San Francisco. J. S. Carswell is president of the corporation and E. H. Biddison is manager of the Western office.

Among the equipment which Carswell will sell as a result of the new tie-up are relief valves of all sizes and for all services, centrifugal pumps for all purposes, and variable speed transmissions from 3 to 100 horse power with infinite stepless variation within the range of the unit.

R. C. Wilson Appointed Sales Manager

Farrel-Birmingham Company, Inc., of Ansonia, Conn., and Buffalo, N.Y., announce the appointment of R. C. Wilson as sales manager of its Buffalo division, in charge of sales of gears, gear units, flexible couplings and related products.

Mr. Wilson was born in Elmira, New York, where he received his early education. Following his graduation from the University of Rochester in 1925 with a degree of Bachelor of Science in Mechanical Engineering, he was employed by the Gleason Works in Rochester for seven years. While with that company he specialized on spiral bevel gears and the development of the hypoid gear. Coming to Farrel-Birmingham Company in 1934 as Sales Engineer, Mr. Wilson worked in that capacity until 1942 when he became assistant to the Sales Manager, which position he held until his present appointment.



BELLINGHAM IRON WORKS AWARD

Captain H. N. Wallin (left), supervisor of shipbuilding for 13th Naval District, awards the 5th "E" pennant to firm. Representing employees are Emil Ebergsen and Ted TeSelle; Iver Nelson, gen. supt.; A. W. Talbot, president; and, Lt. E. J. Hoffmann, resident supervisor.

Awards

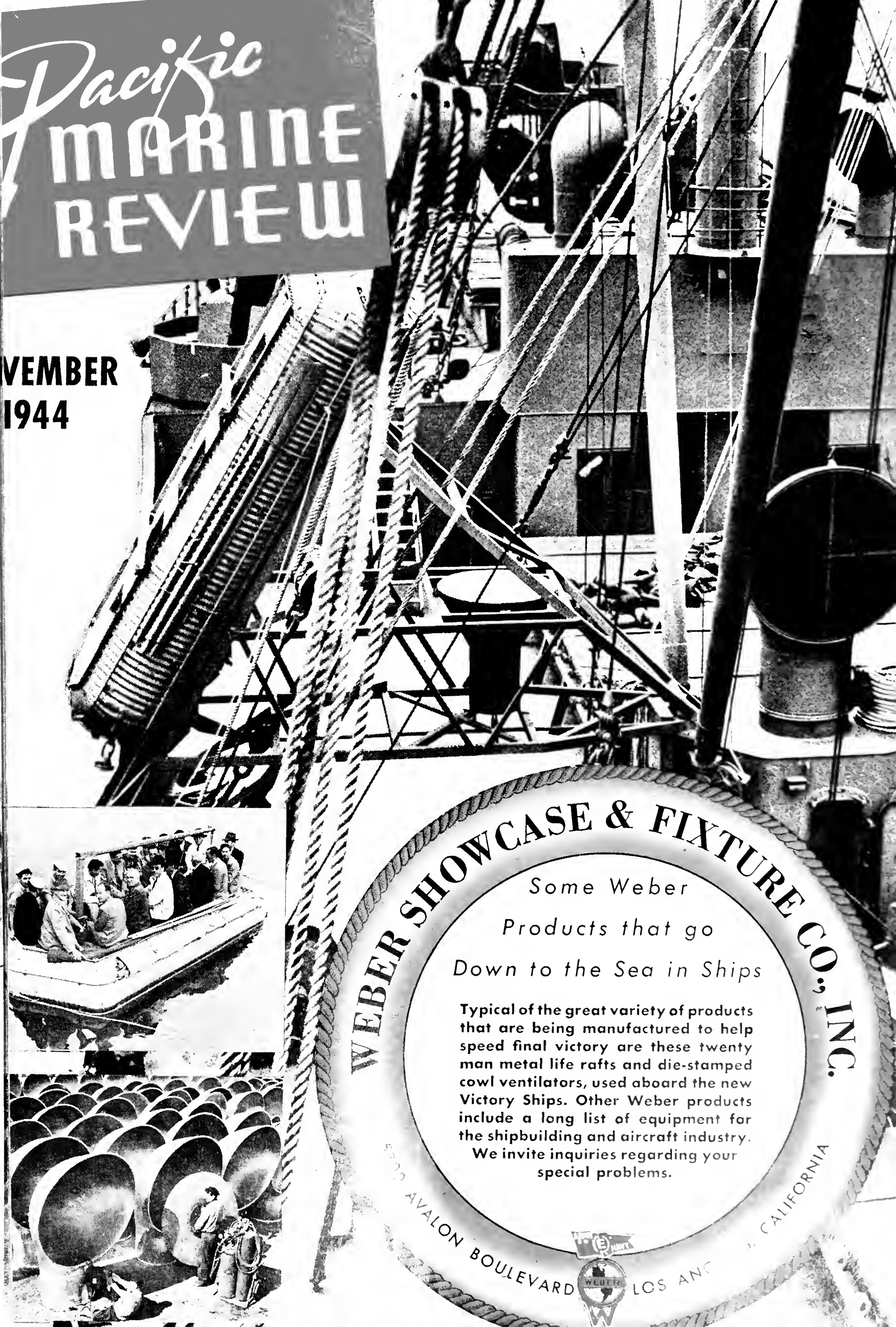
Radiomarine Award

For "continued outstanding production," employees of Radiomarine Corporation of America have earned a third star for the company's Army-Navy "E" flag.

Charles J. Pannill, president of Radiomarine Corporation, was notified by Admiral C. C. Bloch, USN (Ret.) that a third renewal of the "E" award has been granted by the Navy Board for Production Awards. This honor came three weeks after the U. S. Maritime Commission awarded the Radiomarine Corporation of America the third gold star to be added to its Maritime "M" Pennant.

FOURTH "M" TO JENKINS BROS.

U. S. Maritime Commission's "M" pennant with four gold stars was raised over the Bridgeport plant on September 2d. Officiating at the simple lawn ceremony, were Bernard J. Lee, vice president in charge of manufacturing, and members of the Labor-Management Committee.



Pacific MARINE REVIEW
VEMBER
1944
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Pacific MARINE REVIEW

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Official U.S. Navy photo

It's Parity— Not Subsidy

Pacific MARINE REVIEW

The Merchant Marine Act of 1936, as amended, might be reduced to a single word—"parity."

The Act incorporates, in the final essence, no subsidy, as the word is commonly understood.

What the Act and the so-called subsidy does is to provide for an **equalization of opportunity** for American ship operators with their foreign flag competitors. The parity phrases and phases have strong and binding strings tied to them. The trouble is, many Americans lack an understanding of these strings and restraints and curbs and just how they operate in our peacetime economy.

If we would be willing to live without owning our own ships, if we were willing to have a small, shorebound Navy and if we had no concern for the economic welfare of this nation, the prosperity and well-being of those who manufacture, mine, process and raise things the world abundantly needs, then we do not need parity for American ships. Nor would we have any American ships engaged in foreign commerce and on the trade routes of the world.

Assume that an American ship of a certain class costs $2,000,000 to build in an American yard, with American materials and American workmen. A comparable ship, because of lower wage rates abroad, built in a foreign shipyard would probably cost from 35 to 45 per cent less, depending on the country where built.

In operation of a ship, American seamen may earn as much as $82.50 a month, while their opposites on a foreign ship will earn about $60 a month.

Remember, too, that the American seaman eats superlatively and expensively and has better quarters in which to live.

On the same trade routes, carrying identical cargoes, can the two ships operate competitively? Obviously, the answer is an emphatic NO.

Unless there is some formula of equalization, the American ship operator is hopelessly whipped. Parity is planned to enable us to compete on an **even cost** basis only it is not designed to give American ships an economic advantage over foreign competition.

What the Government does is to assume the difference in the cost of building ships here and abroad, and the differentials in the cost of operating the ships. If that is a subsidy, it is one which benefits only American labor.

One of the strings attached to the parity arrangement is that the ship becomes a part of the auxiliary reserve fleet of the U. S. Navy and subject to requisition by the Government in time of need. The Navy exercised this option at the start of the war, secured many fine and useful ships without delay, thanks to the provisions of the Merchant Marine Act of 1936.

Provision is made for setting aside from the earnings of the vessel amounts sufficient to take care of the deferred payments on the purchase price, plus depreciation funds. Another provision mandates that the operator set aside a share of the earnings from which at stated intervals reimbursement is made to the Government, insofar as possible of the amounts paid by it to the owner, to cover the difference in operating costs. If the ships travel to cubic capacity and down to the Plimsoll mark, they **can** and **will** earn sufficient to repay the Government for the amounts advanced. Profits in excess of 10% are recapturable by the Government.

In the post-war period we must furnish a service under the American Flag that is unsurpassed by others. To accomplish this we should endeavor to avoid uneconomic competition. The Merchant Marine Act represents "equalization" of opportunity for the American operator with foreign flag competitors. It also represents "stabilization," a consummation devoutly to be desired both at home and abroad.

The New Standard 24-Foot Lifeboat

The United States Coast Guard, always vitally interested in any improvements in the design and development of lifesaving devices, has been encouraging and testing lifeboat experiments carried on by the Merchant Marine Inspection Division since 1943. In the search for a roomier, more buoyant and easier driving boat, tentative approval for aluminum alloy lifeboats of built-in air tank construction has recently been given.

In this important experimental work, an attempt has been made to avoid radical or untried innovations in design, and to produce, insofar as practicable, a boat which would be adapted to quantity production. However, the 22-foot dimensions of the majority of lifeboats under construction in 1943, which gave 10 cubic feet of boat capacity per person, were found to have insufficient space for military-equipped crews, so in January, 1943, a wartime allowance of 15 cubic feet of boat capacity per person was adopted, resulting in a 24-foot lifeboat which is more seaworthy as well as more roomy.

The dimensions chosen for the Coast Guard lifeboat were 24 feet by 7 feet 10 inches by 3 feet 6 inches, and built-in air tanks were used. These greatly increased hull rigidity and strength, provided more space for occupants, reduced vulnerability to gunfire, and provided easier emergency repair. The raised cockpit deck was also adopted, greatly improving seating comfort and providing a clear sheltered space where occupants could lie down.

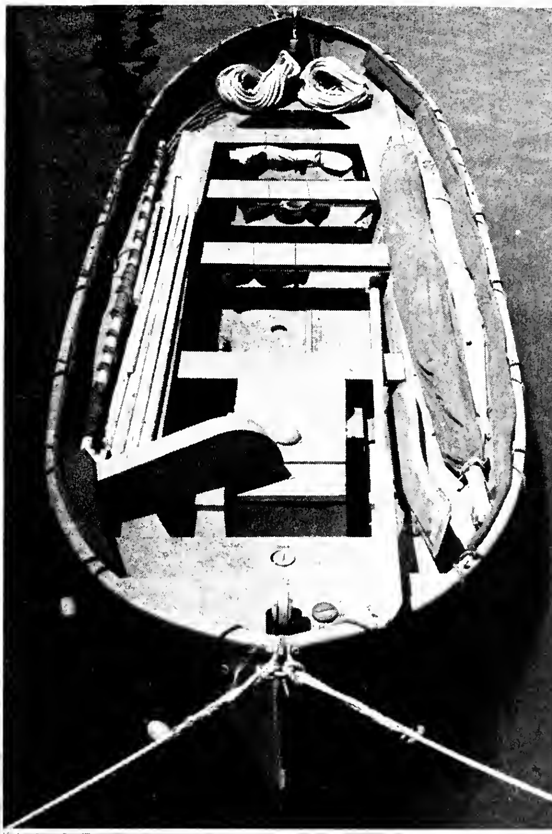
Four styles made as six-foot models were taken to the David W. Taylor Model Basin to be tested. Two of them were drawn up by the Merchant Marine Inspection Division, the third was submitted by an outside naval architect, and the fourth was chosen as most typical of the existing lifeboat design. The models were tested at various speeds and conditions, and the three new models were found superior to the one representing the then existing type of lifeboat. Since the "double-ended" design drawn up by the Merchant Marine Inspection appeared the easiest form to construct and the best adapted to quantity production, it was selected as a basis for the Coast Guard standard 24-foot lifeboat. Incidentally, this form offered the least departure from existing lifeboat design. Dimensions were increased to 24 feet by 8 feet by 3 feet 8¾ inches, and a general construction plan was prepared and sent to the District Coast Guard Officers and lifeboat builders throughout the country, requesting critical comment.

One of the largest lifeboat builders built at their own expense a trial motor-propelled lifeboat based on Coast Guard lines. This was tested under power, sail, and oars, and was found to be better than the conventional model in each case. As a result of these tests and a study of the comments from the District Coast Guard Officers and other lifeboat builders, final plans and specifications were submitted in December, 1943.

Whereas these experiments were carried on as a wartime measure, their value in peacetime and subsequent development in using new materials will not be overlooked by the Coast Guard.

Photos courtesy U. S. Coast Guard.

A picturesque Potomac view is formed by the new 24-foot lifeboat as Coast Guardsmen test its power under sail. The mainsail and jibsail canvas is cut and sewed in sections, with weave running in opposite directions, to provide greater strength. Hood and side curtains are made up in one piece. All canvas is flameproofed and waterproofed. The hood covers approximately one-third the length of the boat.

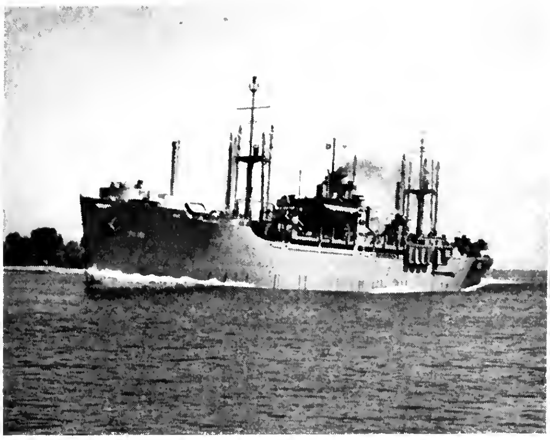


Upper left: Superiority in design of the new lifeboat over the old conventional lines has been demontstrated by tests. Combination of Coast Guard lines, built-in air tanks, and all-welded construction provides rigidity and strength.

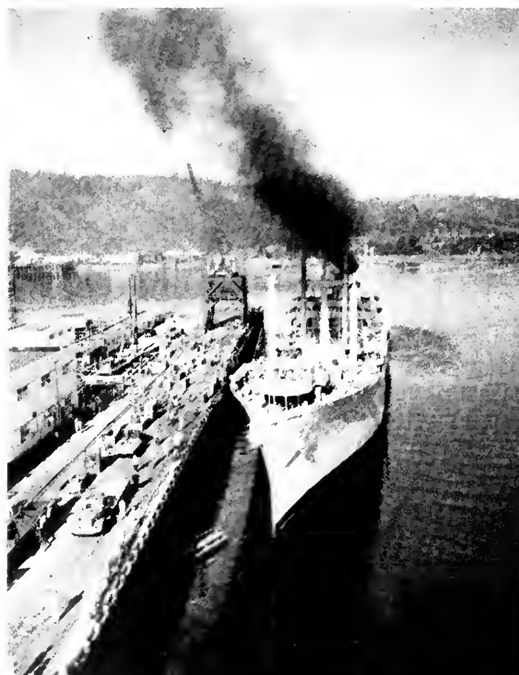
Upper right: Stowage arrangements in the lifeboat approved by the Coast Guard have been studied and designed so that there is no void space in the boat, which is 24 feet long, 8 feet wide and 3 feet 8¾ inches deep.

Lower left: Coast Guardsmen demonstrating the ability of the lifeboat to carry 29 persons and testing its power under oars.

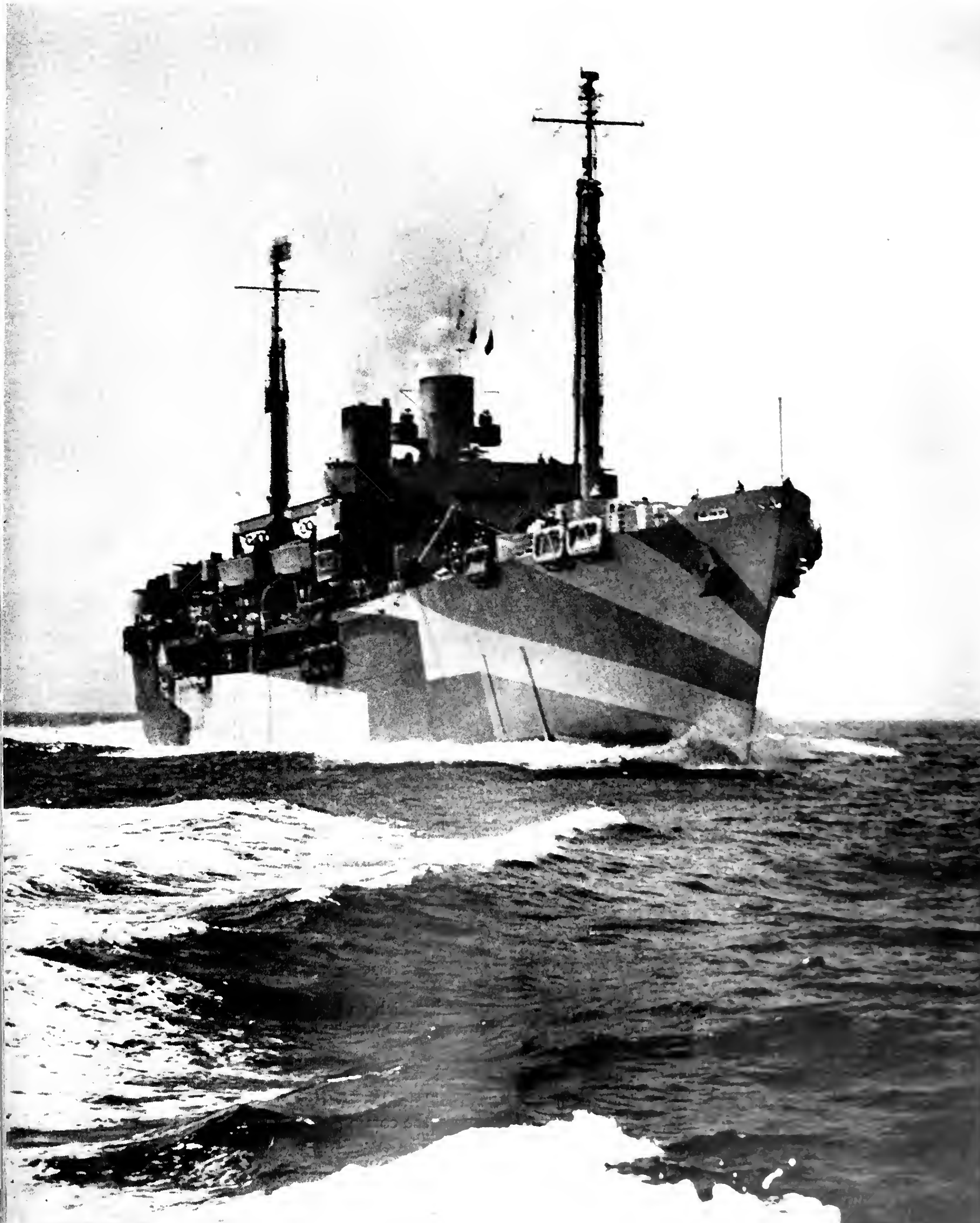
Lower right: Vice Admiral Russell R. Waesche, Commandant of the U. S. Coast Guard, takes the tiller.




Some OREGONSHIP VICTORIES



We present here several pictures of the AP-3 type "Victory" steamers built by Oregon Shipbuilding Corporation at Portland, Oregon. Photos released by U. S. Maritime Commission.

hown here is the first picture to be released of the camouflaged new-design BD-1 Navy combat transport, built by Consolidated teel Corporation for the U. S. Maritime Commission and the U. S. Navy. A fleet of these high-speed ships is being con- tructed at Consolidated Steel's shipyard in Wilmington, California. The ships are complete fighting units themselves. They arry a large number of men, together with all operating and fighting equipment—guns, ammunition, landing craft, nd other material. These vessels have been designed since the start of the war, incorporating many revolutionary featu developed from experience in amphibious landing operations.

A section of the Richfield "100-plus" octane Refinery near Los Angeles. On the left is the towering Thermafor Catalytis Cracking Unit and on the right are the primary cracking furnaces.

New Gasolines for Motorboats

Soaring skyward and suggesting "crows nest" platforms on a battleship are these towers in the Alkylation unit recently completed at Richfield's refinery near Los Angeles.

Marine craft of all kinds in the internal combustion field will reap direct benefit in the post-war era from the new and powerful types of fuel being developed for the air forces, according to a statement issued by the Richfield Oil Corporation in connection with the completion of a new refinery unit which will be devoted to producing "100-plus" octane gasoline.

Until the emergency is over, this super fuel will be available only for our war planes, but, with the coming of peace, its unusual quick-starting, high power and steady cruising qualities will be adapted for use in marine and automobile motors. Much better diesel and lubricating oils will also be provided through the new refining processes which produce this super fuel.

The oil industry has not only been thinking and working along lines that keep abreast of the latest in motor design, but it is even prepare for radical improvements and adjustments in the motor of the future.

In actual operation this new Richfield super fuel makes possible higher compression engines which wi deliver greater power per pound o weight. This has been proven in th use of war planes where shorter take offs, faster climbing, greater speec higher ceilings, split-second faste turns, and longer range were neces sary.

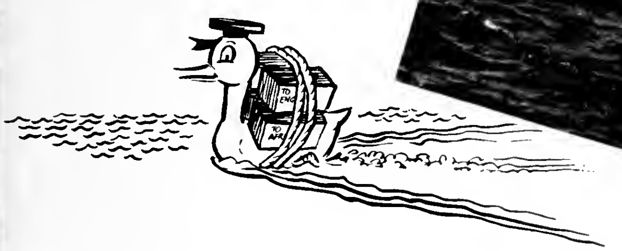
This great oil refining progress ma express itself in the future whereve gasoline motors are used, as the ne super fuel will deliver more powe in smaller, lighter engines than ar now in use.

It also results in a great saving i oil stock, thus stretching out the r serves of this vital resource. Strang as it may seem, it is now possible t make more gasoline from a barrel c crude oil than there is gasoline in i

ugly duckling

By W. S. Sutherland

United States Maritime Commission



Ugly Ducklings they were called vith the air of apology. But that was lmost three years ago. Today, every-one proudly knows them as Liberty hips, and their grim gray hulls have ecome the watchword of a freedom-oving world. For not quite three lifficult years an ever-moving chain f cargo ships—each one identical vith the other—has carried the lion's hare of the burden of transportation. Their performance will be accorded a right page in history.

The story of the Liberty ship is olorful and dramatic. Following the ttack on Pearl Harbor, Axis sub-narines, surface raiders, and long-ange bombers launched a murderous ttack on United Nations shipping.

W. S. Sutherland, U.S.M.C.

While our Allies were dependent upon us for the transportation of most of their cargo, by July, 1942, enemy attacks had more than offset our production with the result that our merchant fleet at that time consisted of under 1300 ships approximating 11,750,000 deadweight tons.

Only by producing ships faster than had ever been known could we meet the unrelenting demands of war. Our armed forces were fast being expanded, tanks, planes, munitions, were being produced at a rapid rate. We needed ships to carry men and supplies to the battle zones of the world.

To augment the long-range shipbuilding program and to provide the maximum amount of tonnage capacity within a limited time, the United States Maritime Commission early in 1941 adopted a standardized design for an emergency type of ship. This design was originally called the "Ugly Duckling." American shipbuilders set to work and within two years had surpassed every known world record in shipbuilding.

The first Liberty contracts set 210 days, or about seven months, as the estimated construction time. The original vessel, the Patrick Henry, took 244 days from keel-laying to delivery. By July, 1942, the fifteen participating shipyards had reduced construction time to an average of 105 days, by June, 1943, to 50 days, and since that time to about 42. Individual speed records have been established for experimental purposes, such as when an Oregon yard finished the Joseph N. Teal in 14 days, only to be outdone by a California yard with the delivery of the Robert E. Peary in 7 days, 14 hours.

With the total of 2158 Liberty ships delivered to May 31, 1944, a

The Author

At present Mr. Sutherland is senior price officer for the United States Maritime Commission with offices in the Central Purchasing Office of the Richmond Shipyards at 14th and Clay Streets in Oakland.

Mr. Sutherland spent 18 years at sea with the Morgan Lines (Southern Pacific). During the last war he was a Lieutenant Commander in the Navy for two years in a New York Navy yard. He was inspector for the Machinery Division.

Following the war he spent five years with the Shipping Board as principal inspector.

He was the operating engineer for the Emergency Fleet Corp. at Baltimore, and in 1941 became associated with the United States Maritime Commission in charge of material control at Yard Two of the Permanente Metals Corp.

John McCone, executive of the California Shipbuilding Company.

cargo capacity had been added to our merchant fleet of nearly 25,000,000 deadweight tons by the "Ugly Duckling" alone. With many of the ships in operation only a short time, it has been estimated that up to January 1, 1944, 1419 of the 1840 Liberties in operation by that date had delivered 40,000,000 tons of cargo, not counting that carried in shuttle service for the Army and Navy in combat areas.

The "Ugly Duckling" had become the "pack horse of the sea." Each one traveled an average of several thousand miles per voyage, each one carried a load equal to the capacity of four trains made up of 300 cars, each one could lift 440 light tanks or 2840 jeeps, or it could transport in a single trip sufficient C rations to feed 3,440,000 men.

The "Ugly Duckling" had earned its new name—the significance, the dignity, the world-wide sailing symbol of Liberty.

Perhaps the United Nations are closer to victory because of the job these emergency ships have performed. Some of them have gone down fighting, most of them have survived enemy action to travel the seas again and again. One day the saga of their individual performance may be known. In the meantime, the feat of their construction can be told.

Silent partners with the builders are members of the United States Maritime Commission who award the contracts, purchase materials, supervise and guide construction activities, and take delivery of the completed vessels. At Washington, D. C., are located the executive heads, Vice Admiral Emory S. Land, chairman, and Rear Admiral Howard L. Vickery, vice chairman. Naval architect is W. E. Esmond, and Chief Engineer J. F. T. Grant is in charge of designs and plans for propelling and auxiliary machinery, piping, valves, and generators. Under C. E. Walsh is the procurement department which purchases materials and equipment used in ship construction.

The Pacific Coast Regional Office in Oakland is headed by Carl W. Flesher whose assistant in charge of construction is J. A. McKeown. The great credit due these Maritime officials is also shared in the field at Permanente's Yard Two by Charles E. Stewart, principal hull inspector, with 46 years of shipbuilding behind

him and Principal Machinery Inspector James J. George, whose service with the Commission has made him one of the most outstanding machinery inspectors of the West Coast.

The Maritime Commission has the same qualified inspectors at Permanente's Yard One in Richmond, as well as at California Shipbuilding Corporation at Wilmington and at the Oregon Shipbuilding Corporation in Portland.

Other partners in the creation of the miraculous construction records are the top ranking executives of the Pacific Coast shipbuilding contractors. Along with the credit due the above named Maritime officials should go the praises so deservedly earned by such guiding geniuses at Clay Bedford, vice president and general manager of the Richmond Yards; Edgar F. Kaiser, vice president and general manager of the Oregon Yards and J. A. McCone, who heads Calship.

Clay Bedford's right-hand man at the Permanente yards in Richmond is T. A. Bedford, assistant general manager, who has under him W. A. Cannon as executive assistant in charge of Yard Two and M. G. Vanderwende, executive assistant in charge of Yard One. Permanente shipyards delivered 519 Liberty ships, or 23 per cent of the nation's total.

At Portland, Edgar Kaiser relies upon Al Bauer as his number one man and on Russ Loffman as general superintendent. The Oregon Yards delivered 330 Liberty ships.

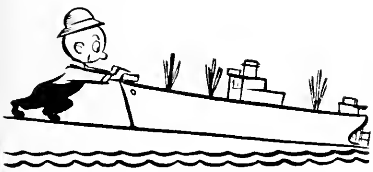
At Calship, John McCone's General Manager is J. K. Doolan, who was assisted by J. W. Kones and Superintendent J. E. Sides. Calship added a total of 300 ships to the Liberty fleet.

The West Coast shipyards under the able direction of the men named above delivered 53 per cent of the nation's Liberty fleet.

Too much credit cannot be given to the Commission and shipbuilding executives for their industry, energy, and cooperation in shattering all preconceived ideas on shipbuilding procedure. The history of this war will carry these names on its roll of honor, as well as those of their large and efficient staffs and the hundreds of thousands of workmen who made the Liberty ship program the greatest mass production endeavor in history.

The Chairman of the Maritime Commission in Washington has under his jurisdiction a competent staff of naval architects who design the various ships. Also at his disposal are experts on hull planning, engineering

Edgar F. Kaiser, executive of the Oregon Shipyards.



and electrical design. The hull design department lays down the lines for the vessel, the engineering group estimates the horsepower required to propel the steamer, the necessary knots per hour to be maintained with the vessel fully loaded, plus all auxiliaries for the engine room. Electricians lay out and provide for generators to furnish current throughout the ship and the miles of wiring to be installed and protected.

Before preliminary plans are finally developed, they are checked to meet all requirements of the American Bureau of Shipping, the Coast Guard, the the Bureau of Marine Inspection and Navigation. The next step is the making of working drawings from which the shipbuilder's engineering staff in turn prepares blueprints. Following the allocation of materials to the builder, the job of construction is now in the hands of the prime contractor.

In any one of the shipbuilding yards we find thousands of craftsmen of all types, loftsmen, shipfitters, welders, flangers, burners, pipefitters, riggers, machinists, shipwrights, electricians, painters, all dovetailing their work on a gigantic assembly line schedule. The degree to which prefabrication has been applied in the building of vast entire sections of the hull before assembly on the shipways accounts for the speed, efficiency, and quality attained by the participating shipyards.

To illustrate today's techniques of prefabrication, we might cite the Permanente Yards at Richmnod where entire midship deckhouses are constructed with piping, wiring, and ventilating systems complete in a separate prefabrication plant. The finished deckhouse is divided into four sections, taken off assembly line, and transported by trailer to the ways where it is hoisted into place on the hull. Likewise the boilers are assembled and moved to the hull when needed. The forepeak, or bow section, the fantail assembly, double bottom sections are all put together ahead of time in the yards and lifted aboard at the proper moment.

During the period from keel-laying to launching, continuous preassembly goes on, as well as the installation of the main propelling unit, the auxiliaries such as pumps and generators, line and thrust shafting, and deck machinery. In assembly, gun tubs are installed with plastic armor, guns are set, ventilators and cowls are located, together with warping bitts and other deck fittings.

Some Material Figures

For a single Liberty ship it takes 2843.2 tons of steel, or 3176.7 tons in gross weight as received from the mill before it has been cut and fabricated. This material is divided into 255 hull plates, 360 frames, 46 girders, 1300 angle stiffeners, 13 major and 30 minor bulkheads, 129 upper and 146 second deck plates with their 1260 brackets. Each Liberty requires 234,917 feet of electric welding, using approximately 145,000 pounds of welding rods of varying diameters; 43,200 rivets; 3122 clips to secure 13,610 running feet of cargo battens; 16,922 feet of manila and 8017 feet of wire rope to rig the vessel; 16 mooring bitts; 12 cargo booms ranging from five to 50-ton capacity; 33,000 feet, or almost six miles, of piping needing 2093 flanges; 2755 feet of copper wire, 888 feet of heavy main cable, 500 feet of subsidiary circuits, or a total of 24,143 feet for the complete electrical installation; 2698 gallons of paint to cover 435,295 square feet of surface.

When these figures for each ship are multiplied by 1125, the Pacific Coast's output, staggering totals result. The amount of paint required to cover this fleet was 3,035,000 gallons, or the quantity of material that went into the construction of this fleet would require 230,000 freight cars for its transportation, or a continuous train with its caboose in Chicago and its engine in San Francisco.

On August 1 of this year 2260 Liberty ships had been completed, and 320 were yet to be launched to conclude the final U. S. Maritime Commission ES-2 schedules. Today most of the Liberty yards have been converted for construction of the Victory type, a slightly longer and faster cargo carrier than the Liberty. The Liberty is still plying the waterways of the world, and though her Victory sister may become the standard merchant ship of the post-war trading world, her story is far from finished. The Liberty will forever remain typical of America—of the spirit and ingenuity of her builders, of the courage and determination of her mariners. The name, Ugly Duckling, is already forgotten, but the name Liberty ship will undoubtedly become immortal.

Cloy P. Bedford, executive of the Richmond Shipyords.

Refrigeration PROBLEMS aboard ship

I. INSULATION AND FIRE RESISTANT CONSTRUCTION

By L. L. Westling

IF ONE could convert a large cold storage warehouse into a gigantic self-propelled portable unit, it would be subject for an extended article of first-page importance in any popular magazine of science or invention. The article would detail how the unit would be mounted in such a manner that it would be flexible yet strong enough to meet the unevenness of the surfaces over which it travels; and how special provisions would be made to absorb vibrations which otherwise might damage construction, machinery, piping, or equipment. Details would be given of how this moving warehouse would carry its own power and refrigeration plants, so designed that it could operate for long periods without interruption for repairs. Its peculiar service would require that it carry many rooms concurrently at a wide range of temperatures, and it would be completely or partially loaded and emptied at intervals of a few days. Compartments would be designed to operate a few days at a very low temperature, a few days at high temperatures, and perhaps extended periods without refrigeration. The space might be subject to frequent wetting from defrosted coils and the transport of ice-packed goods.

Certain conditions would require that the spaces have low head room, some only 7½ ft., and frequently the perishables would fill the spaces so tightly, wall to wall, and floor to ceiling, that even a rat could not crawl through the openings.

A difficult problem this warehouse would have to meet would be that resulting from operations in locations where the outside temperature would be near 100 ° F., and perhaps in two or three days' time in climates with near freezing temperatures. The circulating condensing water would be subject to similar and related changes. Reverse temperature changes might likewise occur, and as abruptly.

Such a warehouse and plant would seem fantastic, a nightmare to the average refrigeration engineer, designer, or operator, and yet these are the conditions to which seagoing refrigeration plants are normally subject.

Insulation of Ships

All of the items reviewed above are subject to attainment on board ship through mechanical design and manipulation, with the exception of that which involves the construction and design of the insulated compartments. This one item is perhaps the most controversial subject in the field of marine refrigeration, with divergent opinion expressed by manufacturers, government agencies, contractors, and operators, all of whom have legitimate background for their views, based upon experience, tests, or market development requirements.

Perhaps the most marked divergence arises among the competitive insulation manufacturers, who become so enthusiastic about their particular products that their limitations are not always fully acknowledged. But "difference of opinion makes horse racing," and without these differences progress and development would be arrested. It is a healthy condition to have divergent views, and it should be pointed out that the writer is simply expressing his own personal convictions.

To begin with, let us make the basic statement—there is no perfect material for the insulation of marine refrigerators. What constitutes the perfect insulator for this service is perhaps without controversy among ship owners, and they strive to find material or combination of materials which nearest approach this perfection. It must meet the conditions outlined for the above fantastic plant and many more conditions not mentioned.

Necessary Characteristics of Ship Insulation

From the ship owner's point of view, the insulation, as installed, should have the following characteristics:

1. High insulating value
2. Light weight
3. Flexible and resilient
4. Good structural strength
5. Resistant to deterioration and disintegration; i.e., long life
6. Impervious to moisture
7. Resist infiltration of air
8. Fire resistant or fire proof
9. Odorless
10. Not conducive to harboring vermin or rodents
11. Reasonable in cost
12. Workable in construction.

It is not probable that all these virtues can be found in any one insulator on the market today, although some approach it. However, the above list represents the yardstick which practical ship owners will apply to new and future construction, when the merchant fleet is once more in peacetime services.

Modern Ship Construction

A modern vessel basically has the first requisite in the assembly of a fire-resistant structure, that of an all-steel enclosure with cellular steel subdivisions. And when we outfit thi

enclosure with fire detecting and extinguishing systems, we have produced a safe fire-proof unit, which we promptly fill with combustible cargo and liquid fuels.

Some observed fires which have started in or spread to insulated ship's spaces have proved most stubborn to control or extinguish and we must acknowledge that in older construction these places have been a vulnerable spot. Anticipated post-war trade based upon prewar trends will demand extended development of refrigerated facilities and we can look forward to a type of construction that will make the reefers no longer a vulnerable spot for the finger of fire. The owners and the Government will be in accord in the matter.

In our present ship construction, and more particularly our extended conversion program, fire-resistant insulators were frequently used only to be nullified by the use of wood framing, grounds, and sheathing. Tongue-and-groove lumber in the floor covering has not been uncommon procedure. The designers have seldom been fire-conscious beyond the need for non-combustible insulant.

The Government's intentions are clearly stated in the oft-referred-to Senate Report No. 184. While references to reefer construction are brief, the requirements are as follows:

"4211. **Insulation for Refrigerated Spaces.**

4211.01. Insulation shall preferably be incombustible or may be of block cork or other approved material, in which case the boundaries of the group of refrigerated spaces shall be of "A" classification.

4211.01 (a). Granulated cork or other highly combustible material of a similar nature shall not be used.

4211.02. Where refrigerated spaces are adjacent to boiler rooms the dividing bulkhead or deck flat is to be insulated in accordance with 4210.01 on the boiler-room side in addition to the normal chamber insulation."

Classification "A" of boundary bulkheads is defined thus:

"4203.02 (a). Class A bulkheads shall be:

4203.02 (a) (1). Constructed of steel, stiffened in accordance with American Bureau of Shipping requirements.

4203.02 (a) (2). Made intact from deck to deck and to shell or other boundaries.

4203.02 (b). Classification.—Capable of withstanding standard test, reaching 1700° F. at the end of 1 hour, for integrity of structure only."

Construction of Ship's Refrigerators

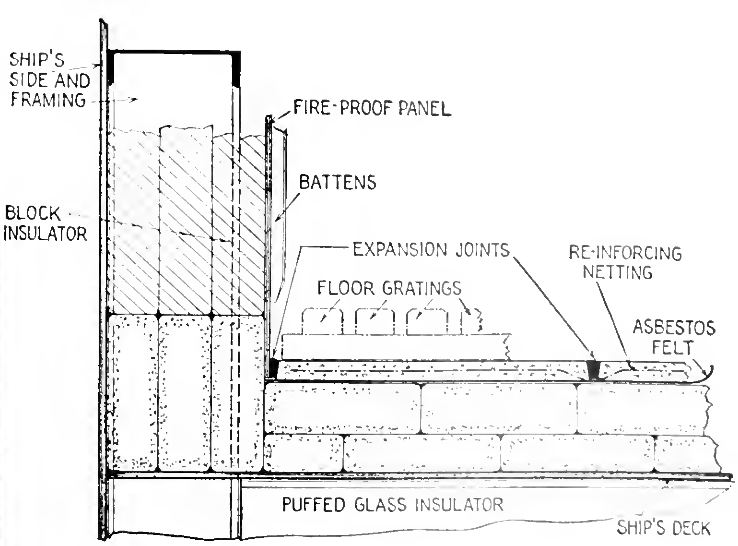
An early effort to build fire-proof refrigerators employed only steel and a fire-proof insulator. The insulant being of the non-resilient type, an internally built steel framing was first installed. The floor framing was constructed of angle bar with floor plate supporting angles on approximately two foot cross centers, the framework being bolted to deck angles. To break steel continuity, the bolts passed through wood insulator blocks, which would preferably have been of asbestos wood. Over the floor was laid 3/16-in. steel plating, and the butt joints were continuously welded over the upper horizontal flange of the internal frame structure. This plating was carried to and extended upwards on the side walls to a height of twelve inches. The side walls were covered with 1/8 in. plating, also continuously welded. The steel lining of the deck and walls is no doubt effective if continuous, but the difficulties in providing a good appearing surface with welded 1/8 in. plate are apparent.

The deck head or ceiling was covered with thin gage galvanized metal held to the framing and at the seams with shakeproof screws. Those who have had the opportunity to observe the short life of galvanized sheathing in reefers of our early construction can anticipate the replacement of the ceiling in the not far future. They know also the probability of the infiltration of moist air through the joints of the ceiling covering. The procedure is not recommended.

A similar method of construction secures the steel lining of floor and walls to the angle framing with countersunk screws, the joints packed with white lead. The steel floor is then covered with a saturated felt mopped in hot asphalt and several inches of magnesite decking.

In both these methods the satisfactory sealing of plate joints or of openings in way of coil hangers, meat rail hangers, and pipe or cable penetration is difficult to provide.

A more satisfactory method employs the laying of asbestos wood grills on close centers between which a fire-proof insulator is placed. Over this are laid layers of waterproof felt, lapped and sealed, and this in turn is covered with one or more courses of fire-proof sheathing secured to asbestos-wood grounds by wood screws. To seal openings for hangers and pipe, various methods are employed, including gasketed or plastic sealed plates and thimbles. This procedure approaches the desirable hermetic sealing of the concealed spaces. When the insulant is capable of holding moisture or does not inhibit infiltration of air, hermetic sealing is absolute requisite to ship's refrigerator insulation.



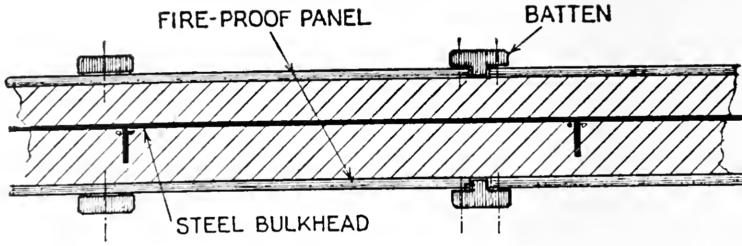
Sectional elevation of deck and ship's side.

Recommended Construction to Meet Present Legal Requirements

With the endorsement of the Matson Navigation Company of San Francisco, initial development work was undertaken by the writer early in 1937 to meet the anticipated enforcement as law of the contents of Senate Report No. 184. In that same year a small installation was made aboard ship along the chosen lines and was followed by installations for cargo carriage on passenger vessels. It appears that the proving period is now over and recommendations can be made for this method of construction.

To comply with the regulations, the **boundary bulkheads** must be of steel. The partitional bulkheads should likewise be of steel. Door openings should be of channel iron with channel crossheaders with bracketed extension plates of the channel flanges for the support of door hardware. The bulkheads should be of light steel, flat bar stiffeners, butt-welded joints and continuous, deck to deck. All openings and ferrules for piping, cables, etc., should be welded into place before placing the insulator. It is recommended that all surfaces to be concealed by the insulator be cleaned and be given a light coat of thinned adhesive cement.

Corkboard or **equal block-type insulator** with good cohesive properties is neatly fitted to the structure and well covered on applied face and edges with the approved waterproof adhesive cement. It may then be applied to the tacky surface of the primed steel and held in place by one of several methods, until the cement is set. Additional courses of insulator are fitted in the same manner over



Plan view section—partitional bulkhead.

the preceding course. All extended steel structure, beam or girder flanges, etc., should have a minimum of two inches of insulator, and the completed face of the insulated wall should be continuously even and smooth to receive and support the inner lining.

Special treatment of the wall base is associated with the floor covering and is described below.

The level and smooth **surfaces of wall and ceiling** should be covered with an asbestos - Portland - cement composite paneling neatly fit, primed, and set up in the adhesive cement. For reasons of durability, the paneling over resilient insulators should not be less than ⅜ in. thickness. The paneling should extend to the insulator in the floor and the face should bond to the floor extension joint. Where cost is not a factor, corners may be fitted with quarter rounds cut from 4- or 6-in. pipe made from the same materials. Joints between adjacent panels should be left open one inch which permits of inaccuracies in fitting and during construction facilitates freeing of volatiles from the adhesive cement. These openings may be covered with 3-in. wide battens of asbestos wood held with cement and countersunk wood screws into the panels. Additional battens should be installed midway between joints to act as cargo spacers to prevent cargo contact with the panel and to permit circulation of air.

Where the walls are covered with coils, the battens should be of 2-in. thickness as coil spacers for air movement and on bare walls the battens may be of 1 in. thickness.

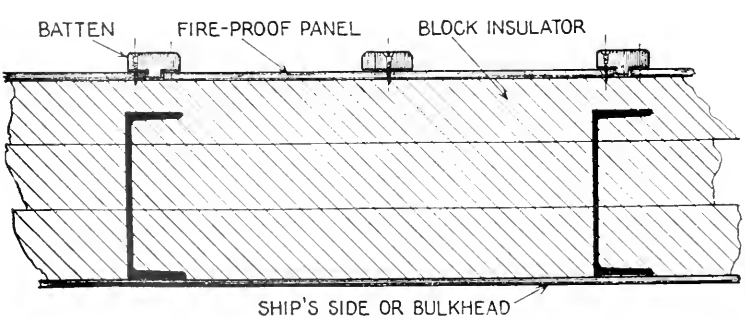
The ceiling may be treated in the same manner, except the battens need not be thicker than ⅜ in. Where meat rails are installed, the batten centers and panel seams should coincide with one side of the flat bar hangers, the batten notched out and a filler piece neatly reset in cement.

Due to the presence of volatiles in the adhesive cement, it is recommended that no **paint** or **coating** be used on the panels that is soluble or affected by the volatiles, until such time as the volatiles have expended themselves to the atmosphere. The paneling is, however, of such appearance and character that coating is unnecessary at any time.

Due to the heat capacity of the dense paneling, some sweating may appear on the surfaces during loading or unloading periods, but it is seldom of objectionable quantity. This could be minimized by cork-spray paint which by most observers would be superfluous.

The **deck** or **floor** may be insulated in similar manner and with similar materials. Corkboard, while efficient and possessing the necessary structural strength, reveals its singular weakness in a floor. Due to possible imperfect workmanship of top sealing, tramp water might find its way into the insulation, and after a period of years may become waterlogged, resulting in frost damage, loss of efficiency, corrosion of the steel structure and possibly the development of bad odors.

"Puffed-glass" blocks, while impervious to air and water, are of lower **k** value than corkboard but may be here



Plan view section at ship's side or water-tight bulkhead.

used in compensating thicknesses. This material seems to have adequate structural strength and is not compressible. Keeping in mind the need of flexibility for the flexing ship deck, it is recommended that blocks of no greater horizontally laid dimension than 12 in. x 12 in. be used, and that the edges be cambered or the sharp corners rasped off to prevent fracture from tile-to-tile contact. The interstices should be filled with a permanently pliable waterproof cement to provide the flexibility which is wanting in the body of the insulator block. Further research by the manufacturer to provide flexibility is anticipated. When "foam glass" is used in the floor, it should also be used in the walls for approximately 12 in. above the steel deck to protect side wall insulators from possible tramp water which might otherwise travel upward through capillary movement.

The adhesive cement used in existing construction referred to above was of a type that hardened with slight pliability when the volatiles were expended, but the flexibility was provided by the corkboard insulator itself. However, with a steel base and a fire-proof top covering, we may compromise somewhat in our floor assembly and use as cement a high grade asphalt, upon which we can depend to provide joint flexibility and watertight integrity.

Over the floor insulator, a membrane should be laid. It may be of 15-lb. asbestos felt with lapped joints mopped in with hot asphalt. With "puffed-glass" floor and Transite or equal wall lining, it will not be necessary to flash the membrane to the side walls. It may be said here that the use of lead or metal floor flashing in all types of construction may be considered obsolete practice. The membrane should next be covered with a galvanized wire reinforcing netting for the floor top-coating of a specially composed cement.

The floor slab must likewise accommodate movement and satisfactory procedure has been demonstrated. At the base of all walls a thin batten form is placed and held from the wall by wedge-shaped spacers. A ship-wise man can anticipate lines of deck flexing between pillars and wall offsets, etc., and on these lines a double line of battens with wedge separators is also laid. When the floor slab has been laid and set, the battens are lifted. When dried, the slab edges are primed for bond and the channel filled with a refined asphalt or similar material that will remain pliable at all operating temperatures.

The floor slab recommended is composed of one part "oil-well" cement and one part of a burned shale known as Haydite (54 lb. per cu. ft. of 1/8-in. size). There is added a product known as "Tricosal" which permits a lower water content in the mix, has waterproof qualities and minimizes set-shrinkage. When laid, the reinforcing netting should be lifted into the body of the slab except in way of the expansion joints, where it should be depressed to the membrane. The floor slab should have a minimum thickness of two inches where corkboard or "puffed glass" is used and should be slightly inclined to the floor drains.

The doors, or hatches, and their frames serving the refrigerators are in general of wood but sheathed in metal after the manner of Underwriters fire doors. The doors may be assembled with 4 or 5 in. of insulator set in adhesive cement, and the hardware should be of forged or cast steel.

In reference to the speed of construction of this type of refrigerator, an example may be cited of the pre-war installation on the S. S. Lurline. This vessel discharged cargo from the subject space, three compartments totaling 20,000 cu. ft. were installed in an unpracticed procedure, outfitted with machinery and diffusers, loaded perishables and sailed in a period of three weeks.

The writer feels that while not perfact, the outlined construction more nearly approaches the ideal than any yet demonstrated.

Book Reviews

Nor Death Dismay, by Samuel Duff McCoy, published by The Macmillan Company, New York City, Price $2.50.

The exploits and adventures of the merchant marine during the present war and the part one steamship line plays. The American Export Lines, is the plot of an interesting, informative book recently published by Macmillan Company.

Drawing on the detailed records kept by the skippers of the American Export Lines, one of the major companies handling war cargoes, and on interviews of many of the officers, McCoy's book relates the adventure of men who have risked their lives to keep open the sealane supply routes since Pearl Harbor, the safe passage of refugees, and the exchange of diplomats, the transporting of Red Cross supplies and food to the starving of Europe.

Theirs is the story of the **Gripsholm** and the **Drottningholm**, the "life line from Lisbon," the convoys to Murmansk, and of scantily armed ships that faced bombs at Calcutta, and elsewhere as they carried on their work from the Arctic Circle to the Indian Ocean.

Marine Radio Manual. Edited by M. H. Strichartz, ship radio officer, U.S.M.S., 517 pages with many diagrams and illustrations, published by Cornell Maritime Press, New York, price $4.00.

An adequate hand book written by a man who through his own experience and training in this particular field, is familiar with the problems encountered by radio operators and trainees in their daily routine.

This is the only American book of its kind published to date—a one-volume guide, that clearly explains and amply illustrates the fundamentals and the advanced steps in marine radio operating—a book for the beginner, student and experienced operator.

It contains sample radiotelegrams and charts, maps of the coastal radio stations and glossaries of nautical, radio and electrical terms. Hundreds of practical tips on wartime practices and peacetime procedures that will help the marine radio operator do the right thing at the right time. Indexed for quick reference.

Fusion Welding of Marine Piping. Those engaged in the present large scale shipbuilding program will be interested in the "Rules for Fusion Welding Piping in Marine Construction" published by the American Welding Society.

Copies of the standard are available in the form of a 6 x 9 bulletin from the American Welding Society, West 39th Street, New York [illegible], N. Y., at a price of 25c per copy.

SHIP vibration problems

SOME CAUSES AND EFFECTS

By Lydik S. Jacobsen*

In this paper an attempt will be made to discuss mechanical vibrations involving deformations of a ship's structure as contrasted with gravitational motions of a ship's hull considered as a rigid body floating on water. Rolling, pitching, yawing and heaving of a ship will not be considered.

Theoretical considerations, amply supported by observations, usually assume that the deformational vibrations of structures are elastic, that energy may be dissipated during vibration by damping, and that, as a first approximation, even the damping may be neglected when the object of the study is not concerned too much with absolute magnitudes of vibration.

For purposes of discussion we may define a ship as a primatical bar of cellular construction, partially submerged in, and totally supported by water. It follows, therefore, that the water next to the skin of the ship will participate in the vibrational motions and that water inertia must be taken into accounts, the equivalent mass of water affected by structural vibrations usually requiring experimental determination. From a vibrational point of view a ship is therefore a self-contained system compared to land structures that are tied more or less elastically, through their foundations, to Mother Earth. The relative simplicity of the vibrational properties of the floating prismatical bar is accompanied, however, by the relative complexity of the hydrodynamic forces created by its propellers and by maneuvering in a seaway.

Vibrational Properties of Systems

(1) Let us assume that the ship or prismatical bar is floating in still water. Its vibrational properties or characteristics may then be explored by experimental means or arrived at by theoretical calculations.

(2) Vibrational properties of a mechanical system may be defined as the characteristic, idealized types of motion resulting from interactions of the system's mass or inertia properties with its inherent static equilibrium preserving properties when the static equilibrium of the system is disturbed by external means.

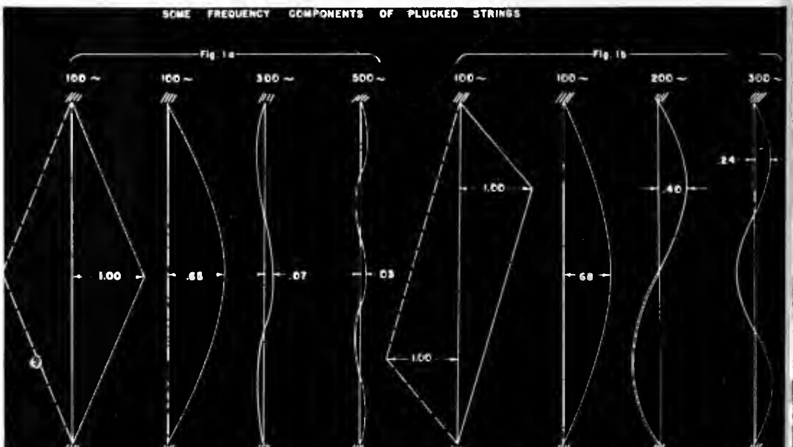
(3) Examples of vibrational systems:

(a) Thus, the vibrational property of a clock pendulum about 10 inches long is a characteristic to and fro motion with a period of 1 second. The pendulum motion itself is described as a periodic motion, approximately harmonic. The mass or inertia property of the pendulum resides in the elementary masses forming the aggregate of the pendulum bob and arm, due regard being taken to the radial location of these masses with respect to the pendulum's suspension point. The static equilibrium preserving property of the clock pendulum, without which no vibration would occur, is the action of gravity on the elementary masses of the bob and arm. Since the instantaneous locations of the entire pendulum or its vibrational configuration is given by its angle of swing, i.e. by one coordinate, it is called a one degree of freedom system.

(b) As a second example of a system with vibrational properties we may consider an elastic string under tension. Unlike the clock pendulum, the vibrational configuration of the string is not defined by one coordinate. If the string is of uniform section, its simplest manner or mode of transverse vibration is a half sine curve loop with the points of zero motion, the nodal points, at the end fastenings. The period with which such a string vibrates in its simplest or fundamental natural mode depends on the mass of the string per unit length as well as upon the initial tension in the string. If the period of the one loop vibrational configuration is 1/100 of a second, we speak of the fundamental, natural frequency of

(Paper read before the Northern California Section of the Society of Naval Architects and Marine Engineers.

Fig. 1



*Ph.D., Professor of Mechanical Engineering, Stanford University; Lieutenant Commander, United States Naval Reserve.

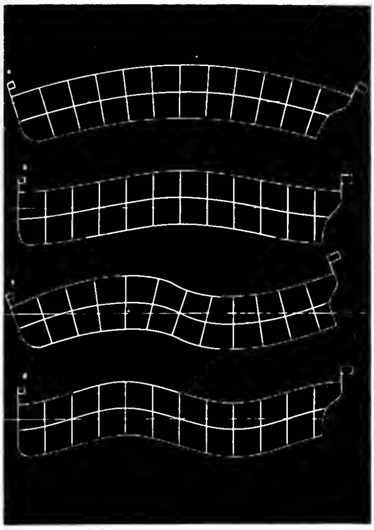


Fig. 2

the string as being 100 cycles per second. Its simplest or fundamental vibrational property is therefore spoken of as the fundamental or first mode vibration at 100 cycles per second frequency.

The force or displacement system necessary for exciting only the fundamental mode of vibration of a string is far from simple. Thus, if the string is plucked at its middle, the vibrational configuration at start will be the two straight lines connecting the fastening points with the plucking mechanism; in other words, a sharp pointed loop, Fig. 1(a). The sharp pointed starting loop and the fundamental mode sine curve loop differ considerably, especially near the plucked region. This difference in configuration brings into existence some of the so-called higher mode sine curve loops, identifiable with higher mode vibrations. If the plucking point is midway between the end fastenings, only those sine curve loops symmetrical about the midpoint are excited, namely the odd harmonics with 3, 5, 7, etc., loops and with frequencies 3, 5, 7, etc., times the fundamental mode frequency. If the string be plucked at any other point than the one midway between the end fastenings, Fig. 1(b), the asymmetry of the starting configuration calls for the presence of both odd and even harmonics, i.e. the 2, 3, 4, 5, etc., looped sine curves with frequencies 2, 3, 4, 5, etc., times the fundamental mode frequency come into existence. The vibrational properties of the uniform elastic string under tension are, therefore, all the looped sine curves whose individual or natural frequencies are integer multiples of the fundamental frequency. It may be said that a string vibrating transversely in a plane has an infinite number of degrees of freedom, but each degree of freedom is characterized by a sine curve configuration of a definite or natural vibration frequency.

Effect of Disturbing Agent

(1) If a disturbing agency of constant but arbitrary frequency acts on the string for an appreciable length of time, a steady forced vibration of the same arbitrary frequency will be developed. The vibrational configuration of the steady forced vibration will depend on where, along the string, the disturbing agency acts and on the frequency of the disturbing agency. If the point of action is near a natural nodal point, the tendency to excite the corresponding natural mode is very slight even if the disturbing force frequency is near the natural frequency of that mode.

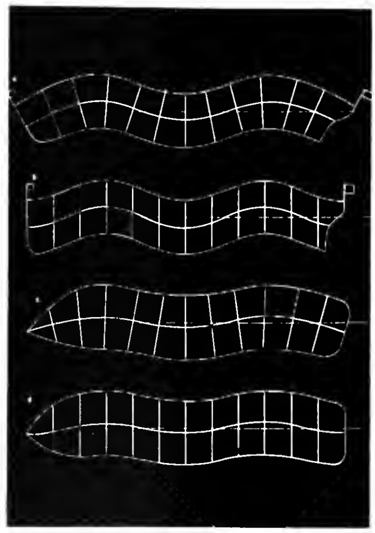


Fig. 3

(2) If, for instance, the frequency of the disturbing agency is 250 cycles per second and its point of action is near the midpoint of the above mentioned string, the vibrational configuration excited will be akin to the three looped, third mode vibration, but if the point of action be moved to the one third point of the string, thereby locating it near a nodal point of the third mode configuration, the resulting vibration will have a configuration akin to the two looped, second mode vibration whose three nodal points are at the two ends and at the middle of the string.

Vibration Properties of a Bar

(1) A bar possessing flexural as well as shearing rigidity differs considerably in its vibrational properties from an elastic string in which the tention is responsible for preserving the static equilibrium.

(2) If the bar is uniform throughout its length L, and if its shearing rigidity be neglected, the two nodal points, corresponding to the fundamental transverse vibrational mode, will be located 0.224 L from the free ends of the bar. Moreover, the vibrational loop will not be a simple sine curve as in the case of the elastic string. The bar will, however, vibrate harmonically, i.e. sinusoidally with time, and its definite fundamental frequency f_1 will be given by:

$$f_1 = 3.57\sqrt{\frac{EI}{mL^4}} \text{ cycles per second}$$

By EI is meant the flexural rigidity of the bar, and by m, the mass per unit length of the bar.

Vibrational Properties of a Ship

(1) Let us assume that the size of the bar is comparable to that of a large ship and that its fundamental frequency f_1 for an up and down motion in air is 2 cycles per second or 120 vibrations per minute. If the

Fig. 4

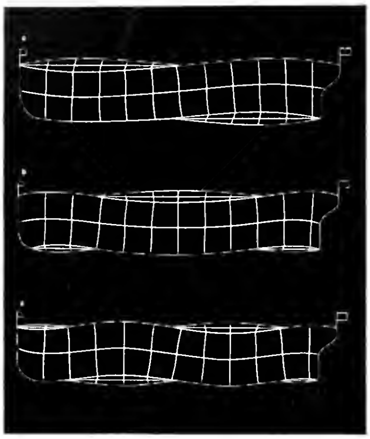


Fig. 5

bar is 600 feet long, the two nodal points, i.e. points of zero motion, will be located 600 × 0.224 = 134.4 ft. from the ends. The bar may therefore be supported at these points without the support interfering with its fundamental mode vibration. If the bar is floating on water the question of nodal point support becomes immaterial, but it is replaced by the more pertinent question of how the water surrounding the bar will participate in the vibrational motion and thereby add inertia to the system.

(2) Experiments with floating rectangular bars as well as with ship's models indicate that the presence of the water increases the bar's inertia from 30 to 50 per cent, depending on the draft and on the shape of the bar. If a 40 per cent increase in equivalent mass be assumed, the natural frequency of the floating bar becomes $2 \times 1/\sqrt{1.40} = 1.69$ cycles per second, or about 100 vibrations per minute.

(3) The fundamental up and down vibration mode of the 600 ft. floating bar will then be a harmonic vibration of 100 vibrations per minute with two nodal points located 134.4 feet from the ends of the bar, and with end motions or amplitudes 65 per cent greater than the amplitude at the center. See Fig. 2 (a). This motion can be excited by a vibration generator located anywhere off the two nodes, or by an unbalanced propeller revolving at 100 rpm.

(4) The second mode or three noded vibrational mode of the 600 ft. floating bar will occur at 276 vibrations per minute with one nodal point at the center and with the other two at 0.132 L or 79.2 feet from the ends. The amplitudes at the ends will be 51 per cent greater than the maximum amplitudes of the loops. See Fig. 2 (c). This mode can be excited by a 3 bladed propeller revolving at 276/3 = 93 rpm or by a 4 bladed propeller at 276/4 = 69 rpm.

(5) The third mode or four-noded vibrational mode of the 600 ft. floating bar will occur at 540 vibrations per minute with the two pairs of nodal points located at 0.094 L and 0.364 L from the ends, corresponding to 56 and 218 feet respectively. See Fig. 3 (a). A five bladed propeller at 108 rpm or any machinery creating 540 vibrational impulses per minute will be able to excite this mode if located between nodes and having vertical components.

Effect of Shear

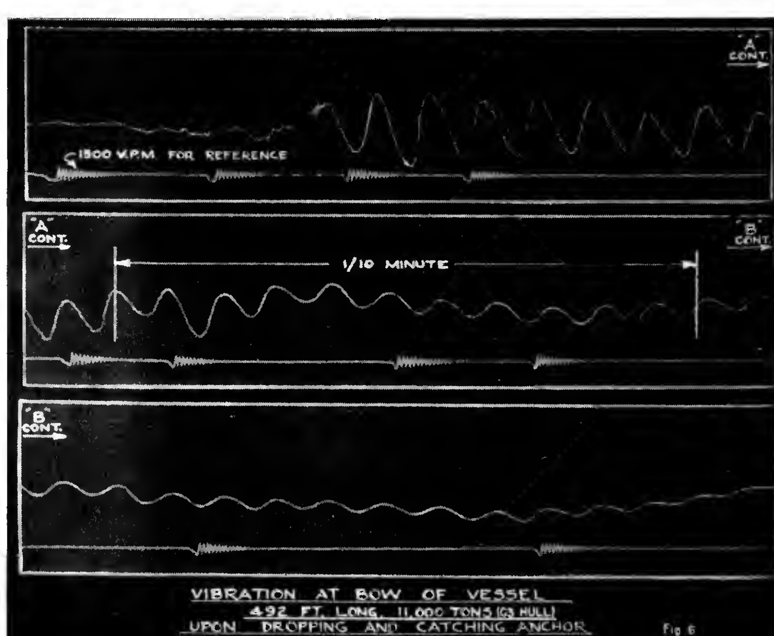
(6) The types of vibration of the 600 ft. bar so far discussed involve flexural rigidity as the only statical equilibrium preserving property. In other words, the bar's shear rigidity is assumed to be infinite. If the length of the bar, compared to its breadth and depth, is of the order of 10, the error in frequency arising from neglecting shear rigidity is quite small for the fundamental mode, but for the higher mode frequencies the error rises to appreciable values. A bar of cellular construction has inherently a low shear rigidity compared to that of a solid bar. It is therefore necessary to consider shear distortions, together with flexural distortions, in estimating the transverse vibrational properties of a bar of cellular construction.

(7) More or less rigorous methods are available for solving the above mentioned problem, but they all involve considerable work. For a uniform bar, the shear distortional curves, unlike the flexural, are sinusoidal with zero slopes at the ends. A comparison of the two types is shown in Figs. 2 and 3. It is seen that the locations of the nodal points of the two types of curves are not too far apart. This means that reasonable estimates can be made about the vibrational configurations, and natural frequencies resulting from the simultaneous action of flexural shear stiffnesses.

(8) Assume, for instance, that the ratio of the maximum shear distortion to the midpoint flexural distortion of the fundamental mode is 0.20. The lowering of the natural frequency of this mode due to shear will then be given approximately by $1/\sqrt{1.2} = .91$; that is, the 100 vibrations per minute frequency of the 600 ft. floating bar will be reduced to 91 vibrations per minute.

(9) For the second mode curve the ratio of the maximum shear distortion to the maximum flexural loop distortion will be $0.20 \times (3/2)^2 = 0.45$ giving a frequency ratio of $1/\sqrt{1.45} = .83$, which means that

Fig. 6



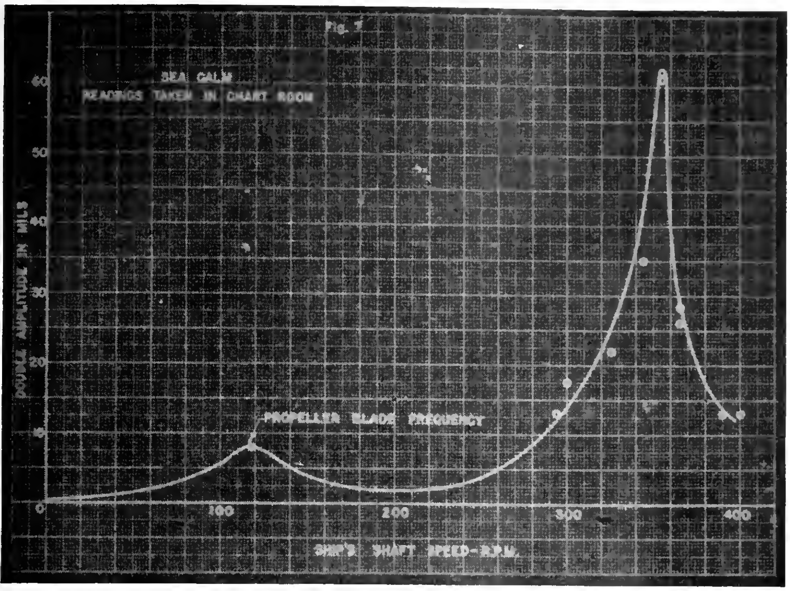


Fig. 7

the second mode natural frequency is 276 × .83 = 229 vibrations per minute.

(10) Similarly, for the third mode curve the distortion ratios will be 0.20 × 2^2 = 0.80, giving a frequency ratio of $1/\sqrt{1.80}$ = .74, and making the third mode natural frequency equal to 540 × .74 = 400 variations per minute.

(11) The effect of the 20 per cent shear distortion in the fundamental mode is roughly equivalent to 45 per cent, and 80 per cent shear distortion in the second and third mode respectively. A 30 per cent shear distortion in the fundamental mode would therefore be equivalent to 30 × $(3/2)^2$ = 67½% and 30 × $(2/1)^2$ = 120% shear distortion in the two higher modes.

Table I shows clearly that the effect of shear distortion on the higher mode frequencies is more pronounced for the lower mode.

Effect of Fining the Ends

(1) So far we have considered a bar of uniform cross section and mass distribution. In order to gain an idea of the effect on the frequencies of fining the ends of the bar, we make use of Nicholson's analysis of paraboloidal bars of revolution about the longitudinal axis. The analysis applies only to flexural vibrations, but it is fairly certain that the assumption of a paraboloidal bar resembling a ship involves the main inaccuracies of application. Figure 4 shows half sections of such bars. For cargo and passenger ships the curve marked m = ½ may be chosen.

(2) Making use of Table II, we see that the fundamental mode frequency of 100 vibrations per minute of the 600 ft. uniform bar would be increased to 125 for the "passenger ship" and to 147 vibrations per minute for the "slenderer sister," the "combatant ship."

(3) Assuming that the shear and water inertia contributions remain as before, we find for a 30 per cent shear, 40 per cent water inertia, passenger ship with a fining of n = ¼, the following frequencies and frequency ratios:

Fund.	Second	Third	Second Fund.	Third Fund.
110	246	391	2.24	3.55

While the 10 per cent shear, 40 per cent water inertia, combatant ship with a fining of n = ½ gives:

Fund.	Second	Third	Second Fund.	Third Fund.
139	320	520	2.30	3.74

(4) Any accurate predetermination of natural frequencies requires a great deal of work. Various methods for doing it are available, but they will not be discussed here.

Horizontal Modes

The horizontal or "snaking type" of transverse vibrations can also be calculated or estimated before the ship has been built. See Figs. 3 (c) and 3 (d). Mode for mode the horizontal vibrations are usually of somewhat higher frequency than the vertical. In general, the two types of vibration are not independent of each other, but a "coupling," due to asymmetry, ties them together with the torsional modes.

Torsional Modes

The purely torsional modes, see Fig. 5 (b) and 5 (c), are easily excited by seaway as well as by fluctuating torque reactions from the propulsive machinery. A predetermination of the frequencies of these modes involves much work and is more open to technical differences of opinion than the calculation of transverse mode frequencies. The actual torsional vibrations of ships are strongly coupled with the transverse modes and just about defy a close predetermination.

TABLE I

Effect of Shear Distortion on Natural Frequency of a Hypothetical, 600 ft., Uniform, Cellular, Floating Bar.

Percent Shear Distortion	Fundamental Mode	Second Mode	Third Mode	Second Fund.	Third Fund.
0	100	276	540	2.76	5.40
10	95	249	455	2.63	4.80
20	91	229	400	2.51	4.39
30	88	213	364	2.43	4.04
50	82	190	312	2.33	3.82
100	71	152	242	2.15	3.43

TABLE II

Nicholson's Results Relating to Natural Frequencies of Paraboloidal Bars in Terms of Fundamental Frequency of a Uniform Bar.

Uniform Bar				Conical Bar	
n = 0	n = ¼	n = ½	n = ¾	n = 1	
1.00	1.25	1.47	1.67	1.82	Fund. Mode
2.76	3.18*	3.55*	3.90*	4.11	Second "
5.40	5.80*	6.18*	6.53*	6.73	Third "

The numbers with asterisk have been interpolated by the author.

Experimental Work

(1) Experimental determinations of natural frequencies of already built ships can be carried out by means of recording instruments, usually of the seismic type. Various forms of mechanical agitators, including deliberate unbalancing of the ship's own machinery, may be used to excite the different modes. The nearly vertical firing of a gun near the bow or the stern will excite the fundamental vertical transverse mode and possibly the second and third as well. The horizontal, athwartship firing of the same gun will excite the torsional and horizontal transverse modes.

(2) Another way of exciting natural vertical vibrations is to drop anchor and check its fall rather suddenly before it strikes bottom. Figure 6 shows a record of a 492 ft., 11,000 ton ship of the cargo or passenger type. The fundamental vibration is 108 cycles per minute.

Vibration Excitation

(1) Wave action in heavy seaway will, of course, excite many of the natural modes of vibration of ships and nothing can be done about it except a change of course with a consequent change of wave action. In regard to rotating machinery on board the ship and its continuous action on the ship's structure, the vibration engineer can, at times, remedy the situation so as to effect a more fortunate condition. The principle of "Resonance," i.e., the coincidence of a natural frequency of the ship's structure with the frequency of the disturbing agency, must be kept in mind as the most important factor governing the magnitude of vibration.

(2) Figure 7 shows a clear cut example of athwartship resonance in a small combatant ship. At about 354 rpm the forces due to the unbalanced propellers created a maximum athwartship vibration of ± 30 mils, while at 354/3 = 118 rpm, the three bladed propellers' hydrodynamic forces caused a minor resonance in the athwartship direction of the same 354 cycles per minute frequency.

Propellers

Revolving propellers, more than any other agency, are responsible for vibration of ships. An unbalanced propeller exerts a revolving unbalanced force and couple on the ship, mainly through its adjacent bearing. The frequency of this force and couple is, of course, once per revolution of the shaft; its intensity is proportional to the square of the angular speed, but the manifestation of its action, i.e., the resulting vibration, is usually masked by resonances so that the vibration will not appear to be proportional to the square of the rpm.

Propeller Mass Balance

Careful static balancing of narrow bladed propellers may be all that is needed to improve the vibration sufficiently, but high speed, wide bladed propellers should be balanced in dynamic balancing machines to a degree depending on the requirements of the service. The residual unbalanced force, as exemplified by the centrifugal force acting on the minimum correction ascertainable by the sensitivity of a modern balancing machine with the propeller in place, should not exceed 1 per cent of the propeller's weight when the propeller is rotating at rated speed. Thus, a 15,000 pound propeller at 300 rpm rated speed may have 150 pounds of unbalanced centrifugal force at that speed. This corresponds to about 4.8 pound feet of residual unbalance. Had the rated speed of the propeller been 100 rpm instead of 300, 9× 4.8 = 43 pound feet of residual unbalance could have been tolerated. The formula for finding the acceptable residual unbalance of propellers in pound feet may be taken as:

$$\frac{29 \times \text{Weight of Propeller}}{(\text{rpm})^2}$$

Since dynamic balance correction involves the use of two correction weights in different radial planes, the rule of thumb for acceptable residual unbalance of propellers may be extended to apply to each of these weights separately. The axial locations of the weights are of consequence, but they are not considered in the simple rule of thumb.

Rotor Balance

For other rotating machinery than propellers, the rule of thumb relating to acceptable residual unbalance is usually based on ½ per cent of the rotor's weight and therefore gives the formula:

$$\frac{15 \times \text{Weight of Rotor}}{(\text{rpm})^2}$$

Thus, a 15,000 pound rotor at 3,000 rpm rated speed would call for a balance better than 0.025 pound feet or about 5 ounce inches. It must

Fig. 8

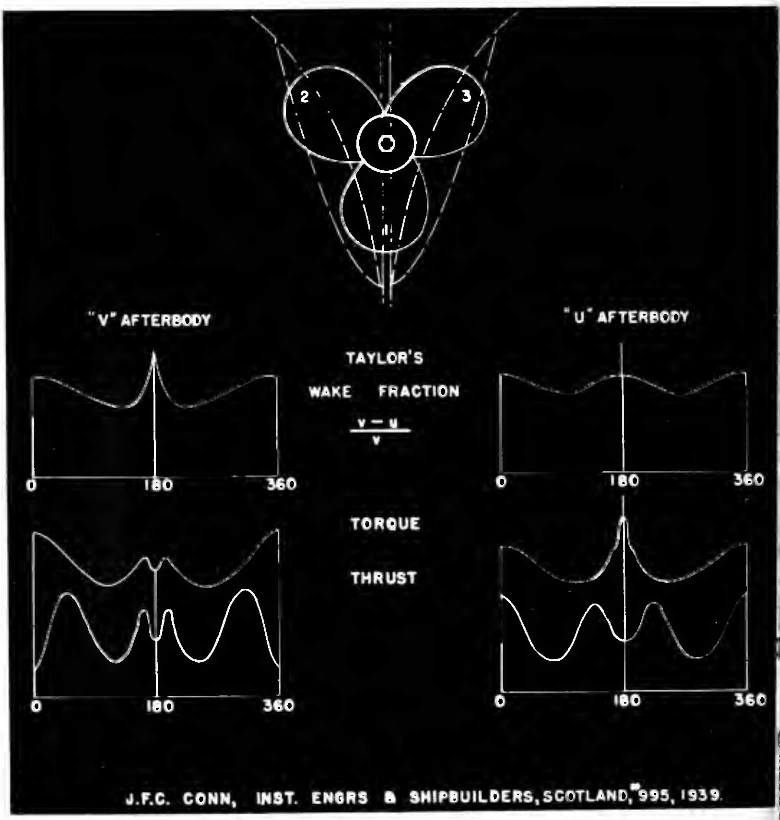


Fig. 9

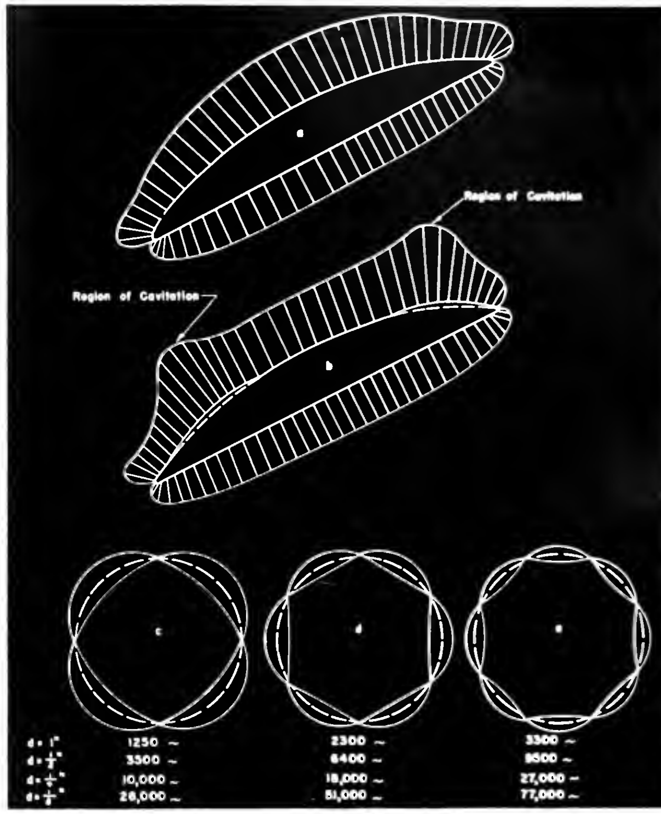


Fig. 10

be admitted that, for a long rotor, the rule of thumb does not specify acceptable residual unbalance adequately, and that most manufacturers succeed in acquiring much better balance than specified by the above rule of thumb.

Hydrodynamic Propeller Forces

Even if a propeller is in perfect mass balance, and even if its pitch and tracking are perfect, the hydrodynamic forces created by the propeller blades will fluctuate as the blades rotate through the non-uniform velocity field surrounding the afterbody of the ship, (see Fig. 8). Hydrodynamic forces of propeller blade frequency and of multiples of propeller blade frequency will therefore come into existence. These forces will act on the ship's body as well as on the shaft and bearings of the propeller. They constitute the inherent, i.e. unavoidable, periodic disturbing forces of propellers. Since they cannot be eliminated, the best that can be done is to minimize their effect on the ship by a judicious choice of: the number of propeller blades; the hull clearances; and the shape of the propeller blades. Thus, if a ship vibrates excessively at 15 knots due to a 3 bladed propeller, a four or a five bladed propeller, of the same pitch as the 3 bladed, will change the critical speed to: $\frac{3}{4} \times 15 = 11\frac{1}{4}$ and $3/5 \times 15 = 9$ knots respectively; moreover, the hydrodynamic force fluctuations at the lower speeds will be considerably less than those corresponding to the 3 bladed propeller speed.

Errors in Pitch

If one propeller blade has a different effective pitch from the other blades, it will create an additional disturbance of once per revolution that may be wrongly diagnosed as being due to mass unbalance.

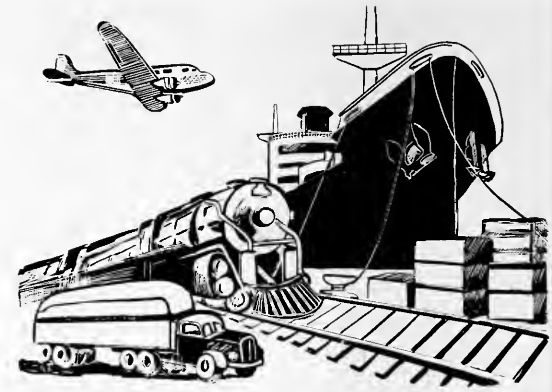
Propeller Singing

Propeller "singing" is a high frequency vibration of the propeller blades themselves. It appears as a more or less steady tone of definite pitch or pitches. The mechanism exciting the vibration and consequent noise is probably due to the periodic generation of vortices at the trailing edge of the propeller blade. The periodicity of the vortex generation depends mainly on the water speed, on the shape and bluntness of the trailing edge, and on the vibration of the blade itself. At a definite rpm of the propeller the frequency of the vortex generation at, say 0.8 R, may correspond to the fundamental mode torsional frequency of the propeller blade. The "casting off" of vortices at the trailing edge point of 0.8 R will, therefore, excite mainly the fundamental torsional vibration of the blade. At a somewhat higher rpm the critical point where the trailing edge will "cast off" vortices at the fundamental torsional mode frequency is located at a smaller radius than 0.8 R. This explains why "singing" may persist over a wide speed range.

A Remedy for Singing Propellers

Figure 9 (a) shows a cross section of a propeller blade at, say .7 R, with idealized stream line flow. Fig. 9 (b) shows the same section when the fluid is no longer ideal or frictionless. At the trailing edge, vortices are formed due to the frictional forces on the surface of the blade. Fig. 9 (c) shows an enlarged view of

(Continued on page 118)



By T. Douglas MacMullen

Some Aspects of American Foreign Economic Policy

By Winthrop W. Aldrich

Chairman, Board of Directors
Chase National Bank

> In a letter to Pacific World Trade, Mr Aldrich authorizes the following quotations from his address to the Executives Club of Chicago.

The Bretton Woods Conference

At the United Nations Monetary and Financial Conference held at Bretton Woods, New Hampshire, during July, we witnessed an effort to find a solution for certain international financial problems — those concerned with currency stabilization and long-term foreign investment. Important though these problems are, they logically come second in point of time to other questions of a political and economic character which beset the world. Such other questions include the political reconstruction of the nations which have been occupied by the Axis powers, the redrawing of the maps of Europe and Asia, the resettlement of populations, and the establishment of some form of international political organization to preserve peace. Closely allied to these problems are such basic economic questions as trade barriers, the reconversion of industry from war to peace, a reasonably full utilization of the labor supply by peacetime production, and the adoption of sound domestic monetary, credit and fiscal policies. Less urgent in their claim upon our consideration are problems of international currency stabilization and foreign investment.

The Bretton Woods conference met upon the initiative of the United States and, in extending the invitation, President Roosevelt made it clear that proposals adopted by the conference would not be binding either morally or legally on the governments represented. Any agreement reached would have to be referred to the governments of the signatory powers for adoption or rejection.

Assets of the Fund

The International Monetary Fund, which is to accomplish the diverse purposes set forth in the monetary agreement, is to have assets that will consist in small part of gold and in large part of non-negotiable, non-interest bearing demand obligations and currencies of member nations. These assets are to be supplied by each member nation in an amount equal to its quota, which varies from $500,000, in the case of Liberia and Panama to $2,750,000,000 in the case of the United States. Total quotas come to $8,800,000,000.

As a practical matter, it should be noted that the size of its quota is not so much a measure of a nation's contribution to the Fund as a measure of its access to the Fund's benefits. This point was fully recognized during the debates at Bretton Woods and gave rise to the unedifying spectacle of nations competing to obtain larger and larger quotas. Since the United States will have the least need to use the Fund's resources, our position becomes mainly that of a contributor, and by far the largest contributor.

The bulk of the assets of the Fund, perhaps 80 per cent of the total, will in all probability consist of the obligations of member governments and of deposits with the central banks of member nations. If the member country so decided, the first could be created by the printing press, and the second, by the simple expedient of book entries.

Obviously the assets created in this manner will not be of uniform quality. A few of the local currencies, including, we hope, the American dollar, may be convertible into gold, at least for foreign transactions. The majority will probably not be convertible into gold, and some may not even be convertible into goods because of the controls over export trade which will persist in many member nations. Inasmuch as the Fund gives nations with relatively poor currencies access on an automatic basis to relatively good currencies, the good currencies may be pulled down to the level of the poor currencies.

The gold holdings of the Fund, plus its holdings of those currencies likely to be in greatest demand, will, it is estimated, approximate $4,000,000,000. Of this amount, the United States will supply about 70 per cent. In other words, our relative contribution to the lendable assets

of the Fund will be more than twice as large as our relative contribution to its total assets.

Question of Exchange Stability

One of the stated purposes of the International Monetary Fund is to promote exchange stability. This is a laudable objective and one which must eventually be attained if international trade is to be given greatest encouragement and if international capital movements are to be promoted. Despite the emphasis on this particular objective, however, the plan includes liberal provisions for alterations in exchange rates. In consequence, the Fund in all probability will become a mechanism for instability rather than for stability. Member nations are free to propose changes in the initial par value of their currencies, if these are to correct a "fundamental disequilibrium." They must consult with the Fund on proposed changes, but the Fund may raise no objection based on the social or political policies of the member nation, even though such policies may have provoked the disequilibrium which induced the member nation to request the change.

If a proposed change, inclusive of all previous changes, does not exceed 10 per cent of the initial par value of a currency, the Fund may raise no objection. The requested change must be granted forthwith. If the proposed change does not exceed a further 10 per cent, the Fund may either concur or object, but it must render its decision within 72 hours. If additional changes are requested, the Fund is given a longer period in which to state its attitude. Should the Fund not concur, is it likely that a sovereign power would continue its membership?

In addressing the House of Lords on similar provisions in the Experts' Proposals, Lord Keynes stated that "it is the duty of the Fund to alter the gold value of any currency if it is shown that this will be serviceable to

Winthrop W. Aldrich
Chairman, Board of Directors,
Chase National Bank

equilibrium." He added that these provisions made the plan the exact opposite of the gold standard and confirmed and approved the dethronement of gold as the fixed standard of value in the United Kingdom.

The provisions of the plan permitting changes in exchange rates are so liberal that exchange depreciation would undoubtedly become an accepted and normal procedure in international financial affairs. Nations could employ exchange depreciation as a substitute for internal fiscal reform and for internal adjustments of costs and prices. Proposals for exchange depreciation from one nation would be quickly followed by similar proposals from others. All proposals could be made in the name of disequilibrium to which the Fund and the member nations would doubtless give an elastic definition.

Proposals for exchange depreciation would be inevitable since the plan attacks the symptoms rather than the basic causes of exchange stability. True exchange stability presupposes the absence of internal inflation and the existence of freely competitive forces. Commercial banking systems must be divorced from deficit financing, floating debts refunded, interest rates unpegged, and price and rationing controls removed. Then, and only then, can exchange rates reflect basic conditions and can true exchange stability be achieved. If these measures are not taken, a spurious exchange stability may exist, which for its maintenance will require frequent recourse to the Fund or reliance on trade controls not less severe than those enforced in Nazi Germany prior to the outbreak of war.

Financial Contribution of the United States

The financial contribution of this country to the Fund will consist not only of our quota of $2,750,000,000 but also of any additional advances that we may make. Our ultimate financial contribution cannot at the present moment be determined. This will depend upon the demand for American dollars, which it is generally assumed will be heavy and which, in the course of time, may exhaust our quota contribution and require the supplying of additional American currency to the Fund.

If the demand for dollars proves sufficiently strong, the Fund will eventually be confronted with the necessity of invoking Article VII of the agreement and of declaring the dollar a scarce currency. Now this section has particular pertinence to the United States, for, as the London Economist declared, the term "scarce currency" must be taken to mean the American dollar since "there is no other currency in the world where the risk of scarcity is so great." If the dollar is declared a scarce currency, member nations are permitted to impose general exchange restrictions on dollar transactions. In referring to a somewhat similar provision in the Experts' Proposals, Lord Keynes declared, in effect, that this action would release countries from the obligation of taking American exports or, if taken, of paying for them.

An Appraisal of the Fund

One cannot study the Bretton Woods proposal for an International Monetary Fund without coming to the conclusion that many of its provisions and purposes are basically contradictory. The Fund wavers between the objectives of currency stabilization and economic development. Emphasis is given to the need for currency stabilization, yet currency depreciation is made an easy and normal process. In England, the proposal is termed the opposite of the gold standard; in the United States, a further application of the gold standard. Credit extensions by the

(Please turn to page 97)

Pacific WORLD TRADE

Dr. Hubertus J. van Mook, Netherlands Minister of Overseas Territories, (Acting) Lieutenant Governor General of The Netherlands East Indies.

G. W. Boissevain, Consul General of the Netherlands at San Francisco.

The Kingdom of the Netherlands

The East Indies

SIRENS OF THE MIDDLE AGES CALL AGAIN

Unfamiliar to most people is the status of the Dutch East Indies. They, with Holland, Dutch Guiana (or Surinam) and the group of West Indies Islands called Curacao (after the main island) are constitutionally one single and indivisible "Kingdom of the Netherlands." The various units are not called colonies but "gebiedsdeelan," which means "parts of the realm."

Holland in Europe covers an area of only 12,579 square miles (it would fit well within one of California's counties), but the Netherlands East Indies—stretching from Java to New Guinea, a distance greater than the length of the United States, has a land area more than 50 times as great as Holland. Java, the most important although not the largest island, has a population of 44,000,000 on an area about the size of New York State. Java is the most densely populated land in the world.

Another fact unfamiliar to most people is that the Kingdom of the Netherlands has not been conquered in this war, although much of it has been invaded. Like the United States and Great Britain it has been fighting the Japs as well as the Germans and although losing 324,000 tons of shipping during the first five days of the invasion of Holland, the Dutch contribution to the shipping pool of the United Nations totals about 2,600,000 tons. These ships, with Dutch crews, have sailed an average of 55,000 miles a day carrying millions of tons of war supplies to the United States and Britain. They have assisted in the evacuation of Greece

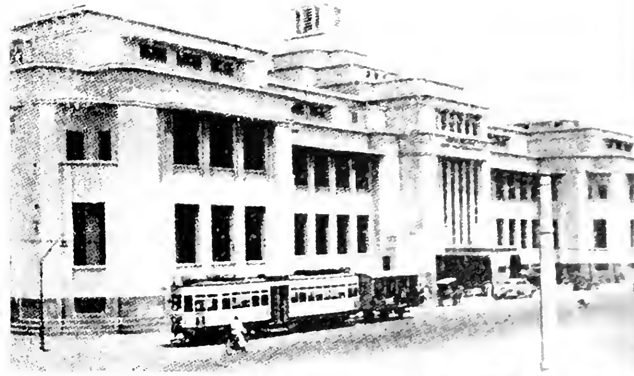
id Dunkirk, in the transport of oops and armaments to North Af ca and Russia, to Malta and Mada- ıscar, to every land where arma- ents and troops were needed. In)42 and 1943 part of the losses suf- red by the Dutch merchant marine ere made good by the considerable ımber of merchant vessels turned 'er to the Netherlands government ıder the terms of the Allied tonnage placement scheme. These ships sail r the Netherlands government un- r the direction of the Netherlands iipping and Trading Committee. ll of them were built since the out- eak of the war and include both otor and steamships.

The war has been carried on by the utch from their "parts of the realm" well as from the Queen's head- uarters in England and from the etherlands Defense Center in Aus- ulia.

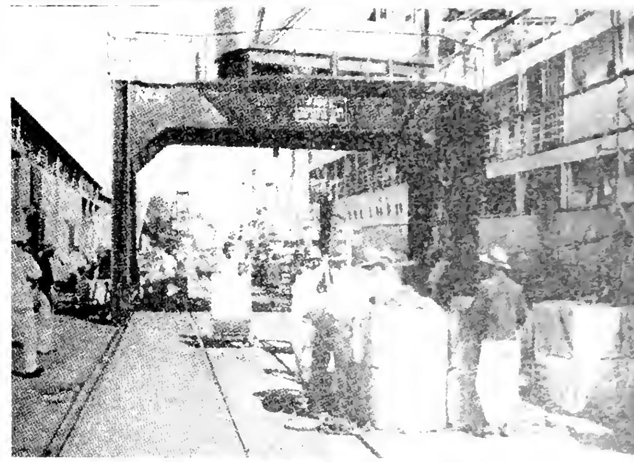
Commercial Development

The economic development of the st Indies by the Dutch has evoked miration from all peoples. Their ccess was primarily because of the plication of scientific methods to e problems of agricultural produc- on. Private enterprise and the gov- nment had joined in the generous pport of laboratories and experi- ental farms for the scientific study tropical agriculture. Several of e chief products of the Indies ex- rt, like cinchona and rubber, were t indigenous, but were taken to the dies and there developed to a high te of yield and quality.

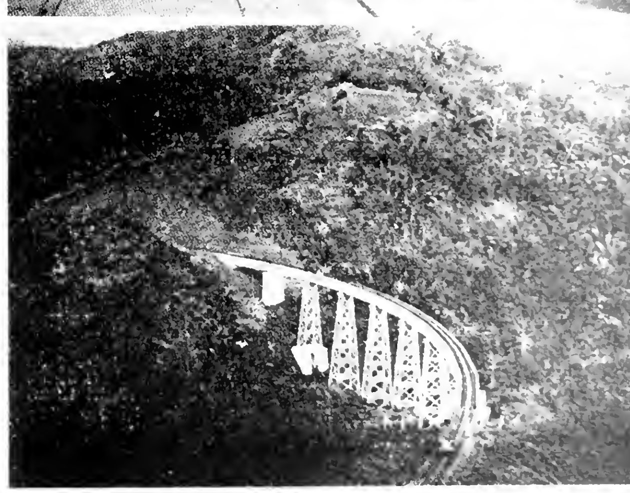
In the years immediately preceding e invasions, the world became very nscious of the Netherlands Indies a producer of important raw ma- rials, some of which were of stra gic significance in rearmament pro ams. The share by the Netherlands



Top: The palatial offices of the Nederlandsche Handelmaatschappij (Netherlands Trading Society) at Batavia, capital of the Netherlands East Indies.



Center: Belawa, on the East coast of Sumatra, is one of the great harbors for the shipment of commodities.

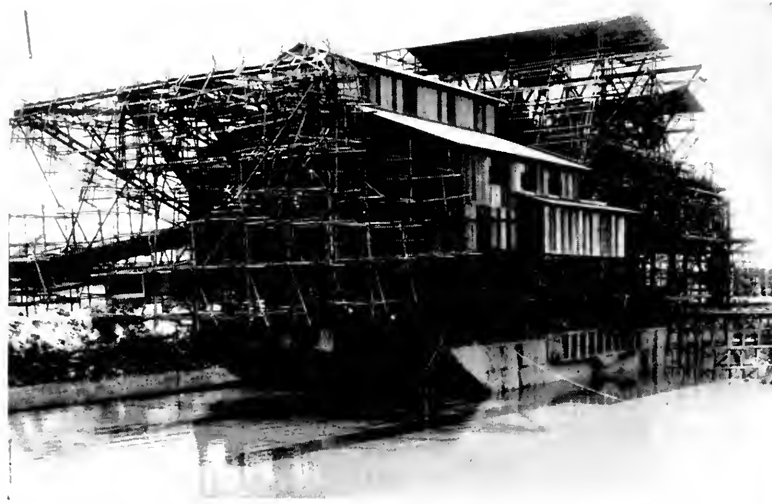


Lower right: Great difficulties had to be surmounted in building modern roads and railways in the highlands of Java: The horseshoe Railroad Bridge, Western Java.

Below: The Soengei Gerong oil refineries on the Moesi and Ogan river junction, near Palembang, Island of Sumatra.

Indies in the world export of a number of commodities was as follows:

Cinchona	91%
Pepper	86%
Kapok	72%
Rubber	37%
Agave	33%
Cocoanut	19%
Tin	17%
Palm oil	27%
Tea	24%
Sugar	11%
Coffee	4%
Petroleum	3%



Holland built dredge of the Billiton Tin Mining Company which was transported to the Indies from Rotterdam all the way down the Suez Canal. This dredger is being placed in an excavation which is being filled with water so that the machine can float around the flooded area.

The production of bauxite was not begun until 1935, but in 1940, the Indies were supplying 5 per cent of the world's output. It should also be noted that although the Indies' share of the world's production of oil was not large, there was in reality very little oil produced in the Far East; wherefore, the oil resources of the Indies were of great military importance. The value of the exports from the Indies in 1940 was $493,000,000, which valuation was a drop of about one-third from 1928, before the world depression sent the price of raw materials down so drastically.

Because of its liberal commercial policy in the Indies, the Netherlands in Europe did not enjoy a very large percentage of the foreign trade of the Indies. In 1938, 22 per cent of the Indies imports came from Holland and abount 20 per cent of the Indies exports went to Holland. In 1933, at the height of Japanese competition, the figures were only 12 per cent and 18 per cent, respectively. In the year immediately preceding the war, trade with the United States had increased remarkably. In 1940, the United States took more than one-third of the exports of the Indies and supplied more than 23 per cent of the total imports, in terms of value.

Post-War Trade

"West Coast industries and exporters can, and I think will, take a big part in the very active trade between the United States and the Netherlands East Indies which will arise from the reconstruction and re habilitation of the Indies," says G W. Boissevain, Consul General o the Netherlands at San Francisco He cited as some of the general need of the Indies: all food stuffs, cannec and processed; milk products; vita mins; products of the citrus industry In capital goods: machinery, tools factory and utility equipment, bridg and railroad materials.

"The open-door policy of th Netherlands has in the past led to a vast trade in which the United State participated actively," Mr. Boissevain pointed out. "Nor would the growtl of American exports to the Nether lands in Europe have been as im portant if they had not been sucl great buyers of Netherlands Indie

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Tobacco cultivation on the Island of Sumatra. Interior view of drying sheds.

More Foreign Trade More Jobs!

By Robert H. Patchin

Vice President W. R. Grace & Co. and Grace Line

The job-producing possibilities of a greater foreign trade and a larger merchant marine are being somewhat overlooked. This is probably due to the erroneous notion that the foreign trade of the United States is but a small part of the total business of the country. By lumping the value of our exports and imports and comparing it with the national total of goods and services it has been possible to show that foreign trade accounted for only about 10 per cent of the whole.

This, however, is grossly misleading because many large industries vital to the welfare of the nation export from 10 to 50 per cent of their production. For example, 14 per cent of automobile production normally is sold abroad, 17 per cent of agricultural implements and machinery, 28 per cent of tractors, 36 per cent of power-driven metal-working machinery, 49 per cent of linseed oil, 18 per cent of printing and bookbinding machinery, 29 per cent of tobacco leaf, 36 per cent of sulphur and 31 per cent of dried fruits. Prior to the depression of the thirties 60 per cent of the cotton crop was exported; in 1938, 30 per cent.

In Terms of Employment

This is of interest not only to exporters but to workers everywhere. It means, for example, that automobile exports accounted for 1⅔ months of the total annual employment in that industry. Likewise for two months' employment in the field of agricultural implements and machinery; 3⅓ months' in the tractor industry and 4⅓ months' in the power-driven machinery industry; 1½ months' in the printing and book binding industry. These examples are typical of many others. Anyone can deduce from the large volume of agricultural products normally exported the extent to which agricultural labor as well as industrial is dependent upon foreign markets.

Everyone knows that, in order to carry the national debt and provide a reasonably high level of post-war employment, the total national economy must be expanded. Back in 1938 the national income was $65 billions. This year it will probably exceed $140 billions. To keep it well over $100 billions will require a permanent step up from prewar levels of agricultural, mineral and industrial production and of the services that make up our economic existence.

The Committee for Economic Development estimates that a total of 55 million jobs is necessary to a wholesome level of post-war production and employment. It is pretty well established by experience that domestic prosperity can not be maintained in an impoverished world. Nor can it be done without greater foreign trade both export and import. The relation thereto of a greater active merchant fleet is obvious. And in World War II a new generation has been bred to the sea. This human national asset should be fostered.

U. S. Not Self-Sufficient

The United States cannot produce all the things it needs. Nor can it consume all the things it must grow and make in order to provide a high level of employment. Exports and imports are bound, in the opinion of experts, to assume a larger importance to the national welfare in terms of employment - jobs.

But the jobs are not merely those in field or factory. Every item of export and import trade requires an infinite variety of labor and service before, during and after the article takes form. For this reason no satisfactory enumeration is possible of the amount of employment in man hours or the number of jobs for which our foreign trade is responsible. Nor do trade statistics provide the key. The Department of Commerce lists agricultural exports as such but this is not and cannot be complete. Many agricultural products enter into manufactured exports but are not credited to agriculture in the export statistics. But the skill and labor of the farmer are here just as well utilized as in the case of wheat shipped abroad in the grain or as flour. For that matter vastly more corn is exported in the form of lard and pork than in the grain.

Far-reaching Effects

American exports, valued in 1939 at $3,177,176,000, create employment from the time a hoe is struck in the ground, or a ton of iron ore is taken from the earth, until loaded aboard ship and delivered in a foreign market. In between are farm hand, railway and truck workers, salesmen and buyers, bankers, insurance men, exporters, clerks, stenographers, telephone operators, longshoremen, steamship officers and seamen, public officials—everyone in fact who has a part in commercial life is to some degree dependent on foreign trade. And this is true of imports as well as exports. For an import article, from the time it is landed on the dock, creates labor as it moves on through successive stages of transportation, processing and sale to ultimate consumption. From 20 to 25 per cent of all factory raw materials normally used in this country are imported and enter into the production of finished manufactures and foodstuffs.

The Department of Commerce in a study of post-war foreign trade calculates that exports may reach a total value of $7 billions and imports a value of $6.3 billions in 1948, as compared with approximately $3.1 and $2 billions, respectively, in 1938.

Those planning jobs for returning soldiers and sailors and workers released from war industry should realize that foreign trade is vital to domestic prosperity. A growing foreign trade may well go far to save the country from post war depression and strengthen its part in world recovery.

Some Cargo Space for South and East Africa Available

The War Shipping Administration and the British Ministry of War Transportation have worked out an arrangement under which cargo space to South and East Africa may be secured, after shippers have obtained the necessary licenses.

It is expected that the new arrangement may lead gradually to a more normal basis of exporting in this trade

So You Want To Be An Exporter!

By Edmund F. Becker

Commercial Intelligence Unit, Bureau of Foreign and Domestic Commerce

To the American manufacturer, appraising the problems inherent in the expanded facilities of his plant and those of his competitors, foreign trade has a new significance. This interest in oversea markets is not peculiar to any particular industry or area. It is not limited to certain types or sizes of establishments. And it is Nationwide. With his sons fighting on some seventy-odd fronts and his goods going to 44 United Nations, it is not surprising that even the smaller industrialist, whose interests have heretofore been confined to domestic or even local markets, has acquired an international point of view.

These men recognize that the war is not yet won, and their efforts in that direction are no less sustained. Too, they suspect that foreign trade alone is not the panacea for all post-war problems. Nevertheless, they have survived in the past because they did not let the grass grow under their feet, and they feel that now is the time to make preliminary and exploratory inquiries into the possibilities of international trade.

Look Before You Leap

Before making any far-reaching decisions in this respect, they are wisely seeking the answers to certain fundamental questions: Is direct foreign trade essential to my business? Should I establish and maintain my own export organization? Many manufacturers have for years placed their products in foreign markets without being involved in the actual mechanics of exporting. Well-established channels of distribution are available to those who cannot or do not wish to maintain their own foreign selling organizations.

Established foreign traders have looked to the Bureau of Foreign and Domestic Commerce of the Department of Commerce as their source in Government of current and detailed information relating to international trade. They have drawn on the Bureau for trade statistics, market surveys, names of selling outlets and sources of raw materials, information on credit, collection, and exchange conditions, tariffs and other local regulations, laws pertaining to commerce, credit terms and prevailing trade practices, competition, local tastes, buying power, and similar basic data representing all of the elements entering into foreign trade analysis and promotion.

At the moment, the facilities of the Bureau of Foreign and Domestic Commerce and the American Foreign Service, in collaboration with which foreign market data are compiled, are utilized principally in making studies for the various war agencies. Statistics and other current data compiled for their use are necessarily confidential and are not available at this time. However, the service functions of the Bureau and the American Foreign Service will be resumed fully after the war.

Laying the Groundwork

Meanwhile, a considerable backlog of published and other nonconfidential material remains available today. Furthermore, it has been possible to keep certain critical services on a current basis and even to render new services in connection with problems peculiar to and resulting from the war, such as those arising from the international wartime controls on export and import trade. To aid the prospective foreign trader, a number of the basic sources of information on international trade have been compiled into a "Guide For the New and Prospective Foreign Trader." This is a selected list of those sources considered particularly helpful in making the initial inquiries into the problems and techniques of foreign trade, in designating the typical channels of distribution and supply and in delineating the more obviously attractive spheres of activity.

Assuming that his initial studies are encouraging, and that the prospective foreign trader wishes to proceed with the analysis of a particular area or areas, the Bureau is prepared to furnish, from its storehouse of information and within the limits imposed by war conditions, specific answers to specific questions.

The Division of International Economy, comprising the American Republics, European, British Empire, and Far Eastern Units, has prepared a number of handbooks supplying essential trade data for practically all foreign areas, and is currently gathering similar material for all areas not occupied by the enemy. The Division of Industrial Economy has prepared studies on all important commodities figuring in international trade, and its consultants in the fields of foodstuffs, chemistry, drugs, metals and minerals, lumber, machinery, leather, and other industries are available for expert advice.

After the War Is Over

The International Economics and Statistics Unit has recently summarized the results of a 20-year study of the economic and financial dealings of the United States in a new publication entitled "The United States in the World Economy." This Unit has also released a 22-page study entitled "Foreign Trade After the War," analyzing the post-war possibilities of foreign trade.

The Advisor on Trade Controls in the Bureau is consulted daily by many foreign traders concerning problems arising in connection with export regulations and various other wartime trade controls. Legal consultants in the several regional units of the Bureau have followed closely foreign decrees and laws pertaining to trade, finance, and commerce, and have summarized their findings in a series of articles.

The Commercial Intelligence Unit provides classified lists of foreign importers, dealers, agents, industrial firms, and local exporters of native products. Here a file of detailed reports is maintained on more than 800,000 commercial enterprises abroad. From this file information can be supplied promptly concerning method of operation, size, number of employees, capital, annual turn-over, ownership or management, representatives or principals in the United States or other countries, and general reputation. This material is particularly complete and current with respect to Latin America.

The Commercial Intelligence Unit is also the source in Government for information concerning the political characteristics of foreign firms, "black lists," and the various wartime trade, property, and financial controls related thereto. The Inquiry and Reference service of the Unit, through its extensive subject indexes, has at its fingertips thousands of useful abstracts, digests, studies, and references pertaining to the field of international trade.

"Foreign Commerce Weekly," the counterpart in the foreign field of "Domestic Commerce," is an important channel for the quick dissemination of information of immediate value to those interested or engaged in international trade. Each issue contains leading articles prepared by specialists in their field. News items, by countries and by commodities, cover general economic conditions, foreign exchange and finance, tariffs and trade regulations, and other matters of current interest. Articles on post-war foreign trade possibilities have appeared in recent issues.

American firms interested in foreign trade identify themselves by registering for the Bureau's "Exporters and Importers Index." In doing so, they provide certain information concerning their background and activities which enables the Bureau to assist them intelligently. An application blank (Form 57 and 57a) is provided for this purpose. Approximately 17,000 exporters, importers, and other organizations interested in foreign trade are registered with the Bureau and utilize its services.

Use Your Field Office

Inquiries regarding the promotion of American trade or commercial or economic conditions abroad, as well as requests for specific information as to market conditions in specific areas, should be addressed to the Bureau or to the appropriate field offices of the Department. The information desired may be in the possession of the Bureau from reports previously submitted by the American Foreign Service. If it is not at hand, the Bureau will endeavor to obtain it promptly from abroad. It is preferable that circular letters should not be addressed to the American Foreign Service officers before the Bureau has been consulted.

Prospective foreign traders should avail themselves at every opportunity of the services of the field offices of the Department of Commerce in their area. The manager and his staff are well qualified to act as local consultants on all foreign trade matters, and much of the material referred to herein is on hand in these offices.

The Foreign Trade Convention

Reports in more extended form from the October Foreign Trade Convention will be published from time to time, but there were certain significant developments which need consideration now.

The Director of the Office of Wartime Economic Affairs of the Department of State, **Charles P. Taft,** reported that export licensing will practically terminate after the defeat of Germany, only a few items will

be continued on the list. Exporters should begin now to make plans for the post-war period and to make arrangements with manufacturers or others for agencies or quotas or whatever may be necessary for the revival of their unrestricted business.

The executive director of the Bureau of Supplies of FEA, Sidney H. Scheuer, announced that the Government has withdrawn from the purchase of certain strategic raw materials such as shellac, mercury, balsa and cobalt vanadium and that it is hoped that tungsten may be imported without government participation by January 1. The United States Commercial Company (government agency for stock-pile operations) has no plans for post war operations.

Admiral Land told the convention that American Steamship lines had $220,000,000 at the end of 1943 that was available for the purchase of vessels for overseas operations and that this amount would finance the purchase of a merchant fleet about double the pre-war tonnage.

A race for international trade such as the world has never seen will get under way after the war among all the leading industrial nations, **R. W. Gifford,** president of Borg-Warner International and vice president of the Norge Division of Borg-Warner Corporation, declared.

Asserting that despite many speeches by members of all types of organizations as well as government officials and members of numerous government bureaus, "We are far from any definite plans" as to solving our post-war foreign trade problems, Mr. Gifford added that the basic reasons for this are first, the almost complete lack of experience on the part of our government agencies and, secondly, the lack of any one strong closely-knit organization that fully represents the foreign trade of this country which might be tied in more closely with our government agencies. Mr. Gifford advocated the formation of an organization by this country equivalent to the British Board of Trade.

"There will undoubtedly be an enormous demand after the war for raw materials and finished products by all parts of the world," Mr. Gifford stated. "How this can be handled and how payments will be made are questions involving many uncertain factors.

"Favorable factors are primarily the enormous pent up need for our raw materials and finished goods and, second, the large credit balances of many countries, especially South America, where the figure is close to the two-billion mark. We can unquestionably secure our share unless restrictions are put in our way by our own government."

Free Book on Export Markets

Alcoa Steamship Company has issued a book "Export Market Opportunities" which deals with their Caribbean territory and offers . . . valuable information. (We have copies available Ed.)

Pacific WORLD TRADE

International Business Conference

WORLD TRADE RELATIONS WILL BE MOTIF

Henry F. Grady, president of American President Lines.

Although less publicized than the Bretton Woods, Dumbarton Oaks, or Quebec conferences, the forthcoming International Business Conference is equally important for both the long-term and immediate prospects for world stability — and for business adjustment to post-war conditions. While Bretton Woods dealt with currency stabilization, Dumbarton Oaks with world peace, and Quebec with the war, the coming business conference will, as its name implies, have a number of vital and varied business problems to consider. And it is hoped the conference will solve them in a more down-to-earth fashion than was the case of either Bretton Woods or Dumbarton Oaks. As far as Quebec is concerned, credit will be reserved for future able strategy, while for anything else the blame will have to go elsewhere.

The International Business Conference is to be held in Rye, New York, November 10 to 18. Chairman is to be Henry F. Grady, president of the American President Lines of San Francisco and Chairman of the Board of the Federal Reserve Bank of San Francisco. A former Assistant Secretary of State, he was largely responsible for the reciprocal trade agreements which have regulated most of our foreign trade since 1934.

Serving with Mr. Grady will be Winthrop W. Aldrich, chairman, Board of Directors, The Chase National Bank; Edward Riley, vice-president General Motors Corp.; George W. Wolf, president, U. S. Steel Export Corp.; Curtis E. Calder, president, American and Foreign Power Company; Harper Sibley, manager, Sibley Farms. Mr. Grady, a native born San Franciscan, is the only Westerner on the delegation, all of the others being from New York State.

The International Business Conference is being sponsored by the U. S. Chamber of Commerce, the National Association of Manufacturers, the National Foreign Trade Council, and the American Section of the International Chamber of Commerce. It will bring together representative groups of outstanding personalities from all the allied nations, about 40 in all, 28 of whom have already accepted. Each is sending a maximum of six delegates and six technical advisers.

In explaining the purpose of the conference, President Eric A. Johnston, of the U. S. Chamber, said that governments are holding conferences on post-war plans and that business too must get ready for the return to peace. It should go ahead with its own program.

It is expected that the subjects to be included in the Conference agenda include:

Maintenance of Private Enterprise
Commercial Policy of Nations
Currency Relations Among Nations
Encouragement and Protection of Investments
Industrialization in New Areas
Shipping Policy
Aviation Policy
World Supplies of Materials
Cartels

Discussions with representatives of the Department of State in Washington were planned for the United States delegates in advance of the Conference. Secretary Hull has already expressed approval of the general plan, and that it is regarded elsewhere as of prime importance is indicated by the type of representation other countries will have. Such notables as John Dodd, M. P., President of the British Association of Chambers of Commerce; Chang Kia-Ngau, former governor of the Bank of China; Dr. Joao Doaudt d'Oliveria, president of the Federation of Associations of Commerce of Brazil, and Sigfrid Edstrom, of Sweden, World Chairman of the International Chamber of Commerce, are heading their respective delegations. Since the Conference was planned, certain devastated areas have been liberated and representaitve delegations have been invited to the Conference from each of them.

The views of the sponsoring organizations—all of which represent both small and large business men and concerns — have been defined clearly. They are opposed to monopolistic practices; they advocate a gradual abatement of wartime government control in the United States, the expansion of trade between nations, and the preservation and development of competitive capitalistic systems.

It is worth a passing notice that when important business interests want business-like solutions to business questions, they invite business men—the best in the world—to participate. This is a policy that has not always been followed in conferences animated by political impulses. For instance, a conference for the solving of World Banking and Currency problems with no U. S. bankers invited.

Philippine C. of C. at San Francisco

The establishment of the Filipino Chamber of Commerce of America is announced by its chairman, Dr. Diosdado M. Yap with headquarters at San Francisco. Branches will be established in principal U. S. cities for the economic reconstruction of the Philippines.

Left: Charles G. Cox, vice president and general manager; top: Charles Hoehn, president of Enterprise; right: E. B. Scott, sales manager.

"ENTERPRISE" In Engine Room and Cargo Hold

Enterprise is an American word, but you may see it on engines in the remote parts of the world. And on oil burners and mills and foundry products and fish-processing equipment. Enterprise is a post-war word. It is a world trade name.

In the Enterprise Engine & Foundry Company's 1943 business totaling $20,000,000 there were hundreds of diesel engines of 6 and 8 cylinders ranging from 225 horsepower to 2100 horsepower. Mostly for war work of one kind or another, the marine plants were installed in tugs, dredges, net tenders, oil tankers, tuna clippers, C-1 cargo vessels and survey boats. The stationary plants were shipped to mountain tops or deserts from Alaska to South Africa. This is a world-wide business that started in a small San Francisco foundry 58 years ago.

But it is in its post-war prospects as an exporter that we are concerned here, and with the inspiration that Enterprise offers to other manufacturers: there is no limit to the sales horizon. Wherever ships or planes, or trucks, or trains can travel there are sales for the enterprising.

Enterprise gets its business in many ways. An important one is to encourage conferences with foreign consuls. Another way is through voluminous advertising to foreign markets. Another way is through the reputation and wide distribution of its products. And still another is through the constant research work carried on for improving the per-

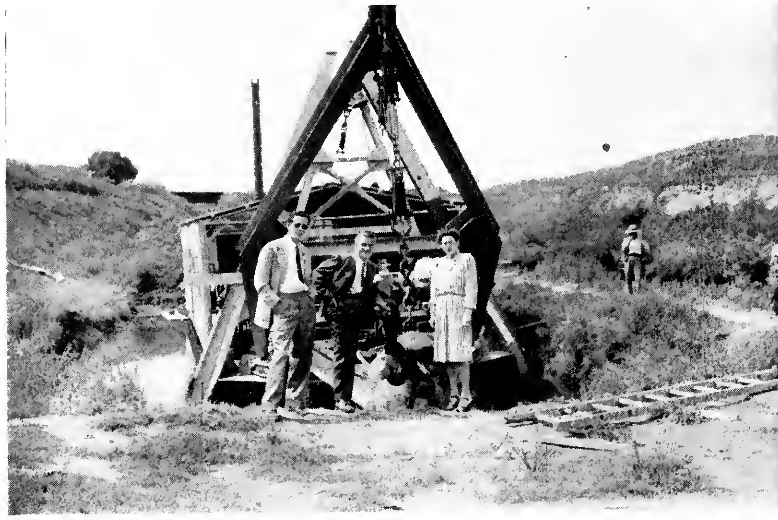
Diesel assembly line.

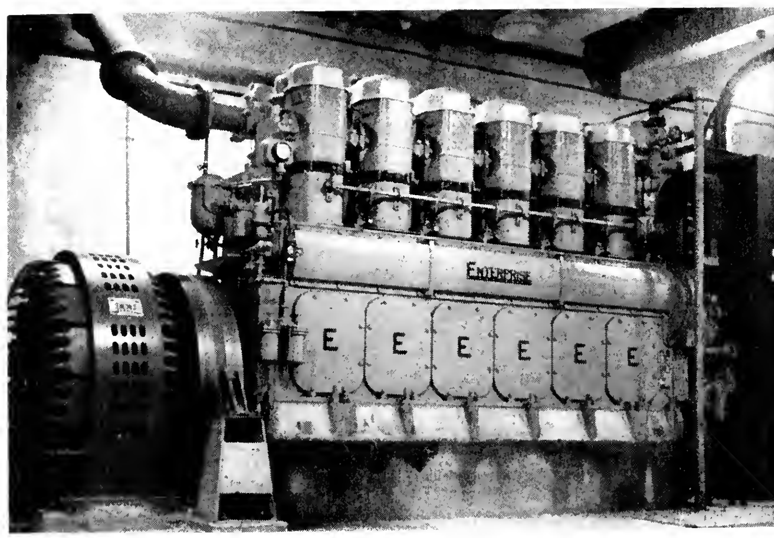
Pacific World Trade

formance and capacity of previous installations.

Recent examples of widespread distribution are suggested by Sales Manager E. B. Scott who recently returned from Mexico, where he attended the opening of Ixtapantongo Hydro-electric plant. An Enterprise Diesel engine provides standby power. This plant is the first of several projects to be built within the next four years. Scott says there is a growing need throughout Mexico for diesel engines for pumping, mines, flour mills, sugar refineries and other industries.

The British Supply Ministry has just ordered an Enterprise vertical mill for a new vegetable oil extraction plant in Southern Rhodesia. The British have also ordered four similar mills for Kingston, Jamaica. A private company has ordered a number of items of Enterprise manufacture including two marine diesels for use in Capetown, South Africa. Not to be exported, but concerned therewith, are four Enterprise mills for installation at Terminal Island, California, for processing copra, flax, peanuts and other oil bearing nuts. The same company is making a similar installation in its plant in the East. Procter and Gamble have installed Enterprise mills for a similar purpose at Long Beach, California, and Edgewater, New Jersey, and there are still other similar installations at Trinidad, British West Indies, and in Australia. Another installation that Mr. Scott inspected while in Mexico was an Enterprise equipped dredge used in constructing the new Mexico-to-the-sea sewage canal.





Top: Enterprise powered dredge starting operations about the center of the new Mexico City-to-the-sea sewage canal. Sales manager Scott and Mrs. Scott are shown with a Mexican inspector.

Center: Enterprise DSG-6 diesel engine installed in Ixapaneonga hydro-electric plant.

At right: The Palomar. Three Enterprise units furnish power for revolving the domes and for lighting.

And so it goes. Enterprise is constantly expanding its catalog which includes a recently developed line of fish processing equipment which, with its fish boat power plants, are financed by its controlling bank.

As an example of the result of research for improving previous installations, Enterprise has been shipping its diesel engines equipped for subsequent installation of turbochargers, which take the heat of the exhaust gases and harness it to drive a turbine fan. The turbine fan operates a blower which charges the cylinders with additional air, permitting the burning of added fuel and producing 50 per cent or more added power per engine without increasing the speed. The turbochargers can be sold after the original installation has been made, hence every sale has a future of its own. Such ingenuity General Manager Charles G. Cox is proud of. He wants every sale to be an introduction to subsequent business.

In the export field, it is one thing to fill an order from a foreign customer and another thing to make that order build for the future. The shipping fraternity and all concerned with foreign trade would like to see more business of that type. The country as a whole will need plenty of it.

The Kingdom of the Netherlands

(Continued from page 88)

rubber, tin, kapok, palm oil and spices."

It goes without saying that much of Japan's and Germany's business will come to the United States hereafter, and Holland itself will have little opportunity to supply capital goods to the Indies for some time to come. This on the authority of Dr. Van Mook, acting governor-general of Netherlands East Indies, who is in San Francisco on his way to headquarters in Australia as this is written.

A mutually welcome exchange of products will be the trade with the Dutch of the Indies. Never to be forgotton is their sturdy resistance to Japanese overtures and demands for oil and rubber in the days preceding the war, while other countries continued their trade with potential enemies, as Russia does, even today. Dr. Van Mook, by the way, was the man who refused to accede to Jap demands.

Dutch East Indies, we salute you, and will come soon again to trade.

Thousands of junks like these carry most of the East Indies cargo. There is an enormous market here for diesel and gasoline engines.

45,000 Foreign Patents Open To U. S. Use

10c Gets a Copy: $15.00 Gets a License

The technical knowledge contained in the 45,000 enemy-owned patents which were taken over by the Alien Property Custodian have been made available to American manufacturers on a basis comparable to the magic of Aladdin's lamp. For 10c a copy of any patent may be obtained, for $5 a complete catalog of all of the 45,000 patents will be sent, and for $15 a license may be obtained under any one patent, or patent application.

There is technical knowledge worth untold millions of dollars in the patents and drawings filed in Washington from Germany, Italy, Japan and their satellites, which cover improvements in every technical field. About 7500 relate to the chemical industry, 1000 deal with ordnance and aeronautics, 7000 deal with electrical subjects, while the fields of transportation, power, and production machinery are represented by about 26,000 patents. There is hardly any branch of industrial knowledge that will not be augmented by the use of one or more of these foreign inventions. Some 5000 are applications for patents that were preserved in secrecy and had not been disclosed to the public at the time of their seizure. It is stated that among these applications lie clues for the development of countless new industries.

Licenses obtained from the Alien Property Custodian are non-exclusive, and royalty-free for the life of the patents, except that patents that were owned by nationals of enemy-occupied countries are royalty-free only for the duration of the war, and will be subject to a reasonable royalty when the war is over.

To those who remember the tremendous advantages gained by American industry from the limited number of alien-owned patents after the last war, and to those who recall the recent clamor raised over the exchange deals made by American oil and chemical companies in order to obtain the use of some of this type of patent, the opportunity here presented for just looking through the voluminous catalogs should prove a worthwhile adventure.

The procedure for those interested is as follows: Write the office of Alien Property Custodian, Chicago, for an index of the catalog lists. Upon selection, send 10c for each patent to the Commissioner of Patents, Washington, D. C. For technical consultation, or special information regarding the utilization of any particular patent in your plant, write to the Alien Property Custodian, Chicago, or to the Alien Property Custodian, 723 Crocker Building, San Francisco. In applying for a license there is a regular form to be used and copies should be requested in your first letter.

A complete catalog is available [illegible] the Alien Property Custodian's office in San Francisco

RUBBER TREE

There are two billion rubber trees in the East Indies, about half of them owned by private planters. It is thought that most of the trees are still intact.

JAVANESE WOMAN

Let's not pass the East Indies without a look at a major tourist attraction. The tourist traffic is World Trade—in a big way.

World Trade News Briefs

China Expects Arrival Of 10,000 Trucks After Burma-Ledo Road Opens

The Army newspaper Sao Tong Pao estimated recently that 10,000 lend-lease trucks and cars are expected to arrive in China after opening of the Burma-Ledo Road.

The newspaper published regulations specifying that trading companies serving the air transport system would have the initial claim on the first group of vehicles arriving over a land route.

W.S.A. Pays A.P.L. for President Coolidge

The War Shipping Administration has paid the American President Lines, Ltd., $7,000,000 for the loss of the pre-war liner President Coolidge, sunk by mine in the Southwest Pacific October 26, 1942 without loss of life.

One of the largest combination freight and passenger vessels flying the American flag before the war, the President Coolidge was completed by the Newport News Shipbuilding and Dry Dock Co. in October, 1931. Cost of construction was $8,017,690. The ship's deadweight tonnage was 17,200 and her speed 20 knots. She had accommodations for 305 first class passengers, 133 tourist class and 402 steerage passengers. In pre-war days she was operated in the trans-Pacific trade between the West Coast and various ports in China, Japan and the Philippine Islands.

Soon after Pearl Harbor, on December 31, 1941, the liner was bareboat chartered by the U. S. Maritime Commission and transferred to the Navy.

W.S.A. Offers Settlement To Grace Lines

The War Shipping Administration has agreed to pay the Grace Line for the loss of the liners Santa Elena and Santa Clara.

The Santa Elena was torpedoed in the Mediterranean last year. She was built at Kearny, New Jersey in 1933 and cost $4,471,310. The Santa Clara was operated as a troop ship under the name of Susan B. Anthony. The Navy announced her sinking in European operations. Her cost was $3,541,167.

The settlement offered for the two ships is $6,875,000.

BRITISH EMPIRE INTEREST

During recent weeks meetings have been held in Los Angeles, San Francisco, Portland, Seattle and Vancouver, B. C. at which Thomas R. Wilson, chief of the British Empire unit of the Bureau of Foreign and Domestic Commerce spoke on "Trading with the British Empire in the Post-war." He gave elaborate explanations of the importance of Empire countries in the foreign trade picture and told how certain obstacles to trade might be overcome.

Thomas R. Wilson

Official figures show that our total foreign trade in 1941, imports and exports, amounted to about eight and one-half billion dollars. Five billion of this, or 59 per cent was with the British Empire and this figure is likely to be very greatly increased. Every possible means should be taken to study Empire conditions, and to this end various meetings are being held throughout the country.

The World Trade Clinic sponsored by the Los Angeles Chamber of Commerce is a splendid development in this direction. Other cities might well follow suit. The "shipping empire," is our world trade friend. Let's get better acquainted.

"As concerning ships, it is that which everyone knoweth and can say, they are our weapons, they are our ornaments, they are our strength, they are our pleasure, they are our defense, they are our profit; the subject by them is made rich, the Kingdom through them, strong; the Prince in them is mighty; in a word, by them, in a manner, we live, the Kingdom is, the King reigneth."—from the fly-leaf of "The Life of Sir Martin Frobisher."

Some Aspects of Foreign Economics

(Continued from page 85)

Fund are to be made on an automatic basis and for a great diversity of purposes. In consequence, the Fund's assets may eventually take the form of long-term, non-self-liquidating credit grants. Good currencies will have been depleted in support of poor. I am convinced that the plan, in the course of time, will offer another illustration of the operation of Gresham's Law, which, as you know, is simply the familiar rule that bad money drives out good. But, in this case, the currencies of the world would be weakened, and the stabilization attained through this means would seek the lowest level.

The International Bank For Reconstruction and Development

According to a statement by Lord Keynes, the idea of the International Bank for Reconstruction and Development originated in the United States Treasury. As its title implies the purpose of the Bank is to finance reconstruction and development. Emphasis was laid on each objective at Bretton Woods in order to meet the desires both of those delegates whose countries had been devastated by the enemy and those whose countries had not been invaded.

Credit Operations of the Bank

Once it has been organized, the Bank is permitted to make direct loans out of its own funds, to make or to participate in direct loans from borrowed funds, and to guarantee, in whole or in part, loans made by private investors. The limit placed on total loans and guarantees is 100 per cent of unimpaired subscribed capital, reserves and surplus. Apparently, it is contemplated that the major part of the Bank's operations will consist in the guaranteeing of securities.

Capital Exports and the Balance of Payments

There are many questions which must be answered before this country can decide to become a stockholder in the Bank. The first concerns the general and yet very fundamental question of the effect upon the international balance of payments of a large volume of loans granted to foreign borrowers. I raise this question because the advocates of the plan apparently are convinced that the establishment of the Bank will lead to large capital exports from the United States and that large capital exports are an indispensable means of maintaining employment in this country and of reconstructing and developing the economic systems of other nations.

My own opinion is that capital exports on a large scale are not required under present circumstances and will be detrimental to debtor as well as to creditor nations. Most of the capital for domestic reconstruction and development should come from local sources. Local labor and local materials should be relied upon to the greatest possible extent in rebuilding devastated areas and in the industrialization of undeveloped regions. Foreign funds should be used sparingly and only where their use will create foreign exchange for the repayment of the loan. If foreign funds are used when local capital is available, a needlessly heavy burden is placed on the debtor's balance of payments. Capital accumulation, like currency stability, is largely a product of domestic policy.

Unless capital exports are kept at a minimum and are limited to projects which produce foreign exchange, debtor nations may resort to the International Monetary Fund to meet interest and perhaps even a portion of the amortization payments due on foreign borrowings. In this event we may find ourselves supplying dollars to the International Monetary Fund in order to enable borrowing nations to service their dollar debts to the International Bank for Reconstruction and Development.

Relation to Export-Import Bank

A second question of a less general nature concerns the relationship of the proposed Bank to existing governmental institutions. What, for example, is to be its relationship to the Export-Import Bank? The suggestion has been made that the facilities of the Export-Import Bank, with expanded borrowing power, could still be employed If this new institution is established, is the Export-Import Bank required? Exactly what function will it serve? And if both institutions function what will be the aggregate volume of foreign credits which this nation may find itself extending either directly or indirectly?

Advisability of Direct Loans

A final question has to do with a fundamental point in international policy, namely, whether in the postwar period the United States Government should extend long-term dollar loans indirectly through an international bank, or directly through one of its own agencies. This question is based on the premise, which I accept, that our Government will itself be called upon to make a moderate volume of foreign loans in addition to our contributions to the United Nations Relief and Rehabilitation Administration. According to its advocates, the advantage of an international institution is that risks are shared. But it is difficult to see how this advantage can exist inasmuch as the bulk of the free assets of the proposed Bank are provided initially by the United States and inasmuch as the majority of the loans will be floated in this market.

I am convinced that to the extent that our Government feels called upon to make foreign loans, these should be granted through the Export-Import Bank, which has accumulated valuable experience in foreign credit operations The loans extended should not be large and need not be large in view of the volume of dollar assets held by many foreign nations.

An Alternative Approach

In my opening remarks I suggested that political and economic problems take precedence over those of an international financial character. International financial questions are extremely important and must eventually be solved, but to attack them first may cause us to lose sight of the more basic problems

The Bretton Woods proposals are no substitute for the real job of economic reconstruction. They are unrealistic and unnecessarily complex.

They are unrealistic in their implied assumption that the creation of credits, the counterpart of the creation of debts, will, in the absence of appropriate fiscal, credit and commercial policies in each member nation, solve the complicated international monetary problems which beset the world. Their technical provisions are needlessly complex, a defect which stems in part from the fact that more fundamental problems remain unsolved.

The All-Important Problem of Trade Barriers

The all-important economic problem of the postwar world is the removal of trade barriers. One of the general resolutions of the Bretton Woods conference gave recognition to the problem but detailed consideration, even if the delegates had been so inclined, was precluded by the fact that the conference was called to formulate plans for a Fund and Bank.

Prior to this war, international trade was hampered not only by various tariffs but also by arbitrary import quotas, regional preferences, linked utilization arrangements, bilateral barter agreements, import monopolies, export subsidies and arbitrary customs procedure. Unless the channels of international trade are reopened, currency stabilization and foreign investment will rest on an ephemeral basis. The world will have been lulled into a false sense of security. We shall have the shadow of stability without the substance. We shall eventually realize that the solution of our basic economic problems has become infinitely more difficult. Perhaps the most dangerous aspect of the Bretton Woods proposals is that they may serve as an obstacle to the immediate consideration and solution of these basic problems.

Need to Implement Commitments

The time has come to implement the solemn commitments contained in the Atlantic Charter and in the Lend-Lease Agreements. Unless tariffs are substantially reduced and other trade barriers are eliminated now, and unless all nations are given equal access to the trade and raw materials of the world, the economic basis for currency stabilization or international investment will not exist.

I suggest that the plans advanced at the Bretton Woods conference should not be adopted by the United States. I propose instead, that the United States, the United Kingdom and other members of the British Commonwealth of Nations enter into immediate conversations on such problems as tariff barriers, imperial preference, export subsidies bulk purchasing and regional currency arrangements. Our own delegation to this conference should include leaders of the majority and minority parties in Congress so that the decisions reached will be assured of Congressional support.

The success of such a conference will depend in no small measure upon the attitude of the United States. We must be prepared to effect substantial reductions in our tariff rates. We must convince the world of our sincerity of purpose. The quality of our leadership may easily determine whether the world will move towards free enterprise or toward collectivism. Never shall we have a better opportunity to reduce trade barriers than in the period of transition from war to peace, when the markets of the world, including our own, will be short of goods, and the exportable products of every country will be in great demand. Under such conditions tariff reductions should be feasible, not only because protection for domestic markets becomes less necessary, but because payment for exports must in the long run be made in imports. Credits, however generously given, must ultimately be balanced in terms of goods received or in losses taken.

England's Post-War Financial Situation

If the proposed conference proves successful, and it will if there is a readiness to make reciprocal adjustments and to seek international solutions for international problems, then I propose that the United States go as far as possible in making common cause with Great Britain and the British Commonwealth of Nations in meeting their financial needs arising from the war. Financial assistance would thus follow the joint modification of trade barriers, both of which are essential to the stabilization of the dollar-pound rate and to the subsequent stabilization of world currencies.

England's post-war financial situation is complicated by two problems, the one associated with her balance of payments and the other with the wartime accumulation of blocked balances. We can assist in the solution of the first problem; England plans to solve the second by direct negotiation with the creditor nations.

Grant-In-Aid to England Proposed

England's difficulties in connection with her balance of payments will persist until she has been able to reconvert her industries and to reestablish connections with foreign purchasers of her products. In the meantime, she will need foreign funds in order to import food and essential raw materials. Before the war Britain would have been able to pay for many of these essential imports by utilizing the return on her foreign investments, or, if need be, by selling part of them. But those foreign investments are now greatly reduced. Lend-Lease did not come into effect until Britain had already been serving as the bastion of democracy through a period of about a year and a half. During that time she spent a very large sum of money in this country, converting the resources of her citizens into dollars to support her armies and her people. If Lend-Lease had then been in effect, we would have provided many of the things she was forced to buy. Without attempting to estimate the benefits she would have thereby obtained, I propose that in lieu of a retroactive application of Lend-Lease, and as an essential element in world economic reconstruction, the United States provide England with a grant-in-aid sufficiently large to establish stability between the dollar and the pound. The sum needed may be a large one—but the problem is large and we must show courage in its solution. It should be borne in mind that my proposal rests upon the assumption that the trade conference has proved successful, that both England and the United States shun totalitarian tactics in international trade, and that both give full support to the principles of economic liberalism.

Stabilizing Other Currencies

Once the dollar pound rate is stabilized, attention can and should be directed immediately to the stabilization of other currencies. The prerequisites are internal political stability, a constructive solution of the problem of trade barriers, a reasonable measure of economic well-being

and the absence of inflation. Once the political and economic prerequisites are attained, the financial problem of currency stabilization becomes relatively simple. Many nations possess sufficient assets in the form of gold and dollar or sterling exchange to stabilize their currencies without external financial aid — a fact which seems to be widely overlooked. Only a few nations will have to seek outside financial assistance.

Certain of the nations, which will have to borrow for purposes of currency stabilization, will probably not be able to do so in the private market. I suggest, therefore, that the Export-Import Bank be given increased borrowing powers, so that it will be in a position to grant long-term stabilization loans of a meritorious character.

Inter-Governmental War Debts

Implied in what I have said is the thought that the problem of the economic reconstruction of the world will largely devolve upon the United States. We can exercise constructive leadership not only by initiating and sponsoring the reduction of trade barriers, but also by lifting from the international economy the burden of inter-governmental war debts. These debts serve only to retard economic reconstruction and to muddy political waters. As a further impetus, therefore, to world reconstruction, we must be willing to concel the inter-government debts remaining from World War I, to repeal the Johnson Act of 1934, and to follow a liberal and even generous policy in connection with the settlement of the Lend-Lease obligations due to us in World War II.

Prerequisites For A Stable Dollar

Also implicit in what I have said is our responsibility to establish a currency in the post-war period in which other nations can have confidence and in terms of which they will be willing to conduct their trade. This will not prove easy. The road back to sound currencies is difficult economically and seldom popular politically. We must be willing to repeal all silver purchase legislation, to repeal the Thomas Amendment of 1933 and to repeal Sections 8 and 9 of the Gold Reserve Act of 1934, which allow the buying and selling price of gold to differ from the gold content of the dollar. We must unblock the dollar assets of foreigners as rapidly as political considerations permit. The dollar must be free to all foreign exchange controls. We must ultimately balance the Federal budget and refinance the Federal floating debt. Without these measures, we cannot establish the dollar as an international currency.

To promote well-being abroad as well as at home, the United States also has the responsibility of achieving a reasonably high level of national income and of avoiding the excesses of boom and, in consequence, the dangers of depression. The attainment of a high level of national income will depend to a considerable extent upon governmental policies in the fields of taxation, labor and corporate regulation. The avoidance of boom and of subsequent depression is largely a matter of preventing post-war inflation. If we succeed in achieving these objectives, the United States will offer a good market for foreign products and will not prove a disturbing factor in other economies.

Currency Manipulation No Solution

In closing, I wish again to give emphasis to the fundamental truth that credit extension cannot serve as a substitute for the adoption of appropriate commercial policies. For this reason it is unfortunate that so much time and energy were given to the Bretton Woods proposals rather than to the main task of economic reconstruction. Currency manipulation will not solve the basic economic problems of a war-ridden world. Once a solution of fundamental problems has been effected, the stabilization of currencies and the extension of international loans will become integral parts of the over all pattern of world reconstruction

Legislative Proposals In Congress

Two proposals that will probably be before the House Committee on Merchant Marine and Fisheries, of which Congressman Bland is the chairman, merit the support of the shipping and foreign trade fraternity.

One is the proposed return of regulatory authority over coastwise, intercoastal and inland waterway operations to the Maritime Commission. This authority now rests with the Interstate Commerce Commission and it is indicated that the latter will be agreeable to yielding such control. Since the ICC controls rail and truck operations and protects them against water competition, shipping lines have suffered almost to the point of extinction.

The other measure has to do with the amending of the Merchant Marine Act of 1936 to extend the provisions of the law to the operation of overseas air transportation by steamship companies. The Maritime Commission favors giving air franchises to steamship companies, while the Civil Aeronautics Board under the Civil Aeronautics Act has assumed such authority and has thus far ruled against steamship companies air operations.

Australia Will Expand Overseas Representation

Wide expansion of Australia's publicity activities overseas was announced in a joint statement by H V. Evatt, minister for external affairs and A. A. Caldwell, minister for information.

The plan involves extension of Australia's diplomatic representation in the United States by establishing consulates in New York and San Francisco.

Press attaches will be named for Australian ministers in Washington and for the High Commissioners of Ottawa and New Delhi while consuls in New York and San Francisco will be assisted by public relations officers

The statement said rapid growth of Australia's interests abroad made it necessary to provide greater facilities for informing friendly nations of Australia's war effort and post war potentialities

Docking crew worker inspects keel blocking under stern of big twin-screw ship in the concrete graving dock at Todd Shipyards Corporation Brooklyn division. In background is watertight steel gate which seals off the drydock.

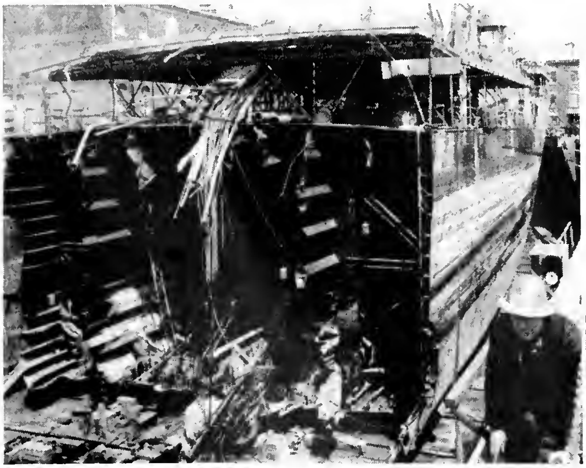
Ship Repair Plays Big Role In Atlantic War

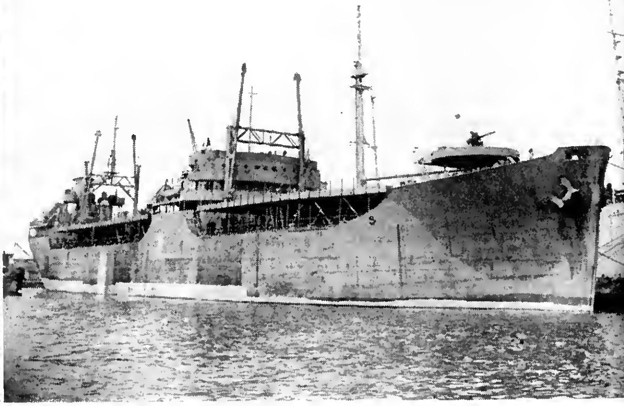
The Battle of the Atlantic was not won by convoy warships and planes alone. In no small part, it was won by American ship repair yards — where naval vessels, tankers, freighters and transports, damaged by enemy action, convoy collisions, or merely in need of routine overhaul, were speedily repaired and restored and sent back to their vital wartime missions of keeping the supply lines open.

The five large drydock and repair yards of Todd Shipyards Corporation, on the Atlantic, Gulf, and Pacific Coasts, have played a foremost part in winning the struggle for control of the Atlantic lanes. The 34 drydocks in these yards are capable of lifting more than 312,000 tons of shipping out of the water.

Thousands of ships — battered, broken, torn apart beyond one's understanding that they still could float; even actually split into separate halves — have come into Todd yards, and from the verge of a nautical graveyard been made staunch and seaworthy again and ready for war. And repeatedly skilled craftsmen from the scores of different trades woven into the intricate business of ship repair have cut down by days, even weeks, the time—immeasurably precious time—estimated to get a vessel back to war.

Ship repair in many ways presents problems more difficult than construction. In war or collision damage it is frequently necessary virtually to rebuild a vessel without benefit of plans. The visible damage can never reveal what a ship has suffered inter-





Left: After half of tanker, Esso Manhattan, in dry dock, showing the ragged nature of the break.

Right: Back to the war goes tanker, Esso Manhattan, which had broken completely in two. Here she leaves Todd Shipyards Brooklyn division after unique repair job of putting her together, staunch and seaworthy, in only 63 days.

nally, and no two jobs are alike. The whole complicated process begins and ends with the dockmasters—the men who can take anything seagoing, from a tug to the biggest transport, out of the water and set her down gently and safely on the blocks of a drydock.

Not long ago Dockmaster Livingston Hislop was informed that scheduled to arrive at the graving dock at the Brooklyn Division of Todd Shipyards Corporation was a certain tanker. Hislop nodded; it was just another ship in the day's work. Then they told him there was something a bit unusual about this tanker—she had broken in two and the bow and the stern were floating around quite independent of each other.

This called for special tactics. What bothered him was not that he had two halves of a ship to deal with, but the "rags" or dragging, twisted steel framing and girders that probably were hanging from the severed edges. They might get caught on his blocking.

He did the job this way: first he brought the after end into the dock, stern first. Then he pumped out the dock. There were indeed "rags," and they had knocked over some of the blocks. These hanging strips were burned off, and the blocks reset.

The next step was to fill the bilges and compartments of the stern half with water, so it would not float off when the dock was flooded to bring in the forward half.

The bow half was hauled in stem first, so that its rags would not foul the blocks. Again the dock was emptied, and the "metal spaghetti" burned away. This done, the dock was flooded once more, the bow half was pulled out into the bay, turned around, and brought back in, broken end first this time. The two halves were lined up so exactly in the drydock that when they were rejoined by the building of a new 30-foot section, the ship was only an eighth of an inch out of true line—less than many a brand new welded ship!

After a ship has been drydocked, there still is a great deal of preliminary work to be done before actual repairs can be started. If there has been damage to oil tanks or bilges where oil has leaked into the double bottoms, tank cleaners must clean out every trace of oil so that there is no

(Continued on page 120)

Left: Dockmaster Livingston Hislop of Todd lifts big ships out of the water and puts them high and dry in the graving dock with hand signals like this.

Right: Dockmaster Hislop signals to slack off the lines a little on one side as he centers ship in graving dock.

Left: Clenched fists definitely say "hold fast" as Mr. Hislop guides the ship, by hand signals, into graving dock.

Right: Using post as "docksight," he signals "hold fast" on port side with upraised fist; "slack off" on starboard with extended palm down as he guides ship into big graving dock.

Left: with the ship in dead center of the graving dock, put there by Mr. Hislop's hand signals to men handling lines and winches, he signals "go ahead on No. 2 pump."

Under the pressure of wartime conditions, man-power and material shortages, and the lack of ideal shipyard sites, the company set about to construct a yard.

The only available location in the Los Angeles-Long Beach harbor area was a narrow strip of land 215 feet wide and 2200 feet long and surrounded by high steel oil well derricks. It was not a conventional spot to start a shipyard because of the peculiar layout, but by ingenuity and resourcefulness, the obstacles were overcome. Not only were the obstacles overcome, but the layout of the yard is such, that it has promise of becoming a prosperous survivor of wartime expansion, since it offers advantages to the fishing industry in matters of speedy construction and repair facilities, not possible at yards built on conventional lines.

Because of the narrow water frontage, it was necessary that a marine railway be used to launch the ships. This railway, which can pull a ship from the water for repairs as rapidly as it can lower a ship into the harbor when ready for launching, has a capacity of 1500 tons, an under water length of 488 feet, on a gentle slope of 1 to 16, ending with a depth of 20 feet 6 inches of water at low tide. It can handle a ship 225 feet long with a 40 foot beam.

A Ship Production Line in An Oil Field

"FS's," freight supply vessels for the U. S. Army are being produced by the United Concrete Pipe Corp. in what closely resembles production line methods. Not only is the company's shipyard unconventional in that it differs from the ordinary yard by having a so-called "production line," but it is possible to convert it to any type of ship construction with a minimum of change over. Consequently it has large post-war possibilities for rapid construction of steel fishing vessels, small coastal craft and workboats.

The company, which is headed by B. J. Ukropina, president, has long had a plant at Baldwin Park, California, 35 miles inland from Los Angeles-Long Beach harbor. Before they could build ships they required both a shipyard and personnel with shipbuilding knowledge. Although they were veteran steel fabricators long before the outbreak of war, they were without marine experience, so they added men with this experience. Cecil Drake, a marine diesel engineer well known in the tuna clipper industry, and F. O. Mjellem, veteran shipbuilder, were engaged by the firm.

Above, left: FP-392 on her trial run.

Right: FS-547 about to be launched at United Concrete Pipe Corp. yard.

Reading port to starboard: Mrs. Yola Anderson, James S. Hines, Mrs. James S. Hines, C. W. Drake of United Concrete Pipe, Mrs. Cliff Jones, John Harney of Long Beach Boat Shop, and Mrs. Marion Hicks.

Extending back on the landward side from the inclined part of the marine railway are the extension tracks. Paralleling these extension tracks is the production line, from which any one of the various vessels under construction may be pulled out of line and moved down to the launching platform. The ships are built "end to end" on slabs rather than shipways.

On the other side of the extension tracks of the marine railway and across the narrow strip of land which is the shipyard, are located the shops, warehouses and offices. These shops also parallel the tracks so that gasoline powered gantries, operating on the extension, can pick up loads from in front of the shops, swing around and lower them onto the building slabs where the ships are under construction. Furthermore, by increasing the length of the landward side of the railway, the size of the yard can be enlarged to any desired degree with a minimum of alteration.

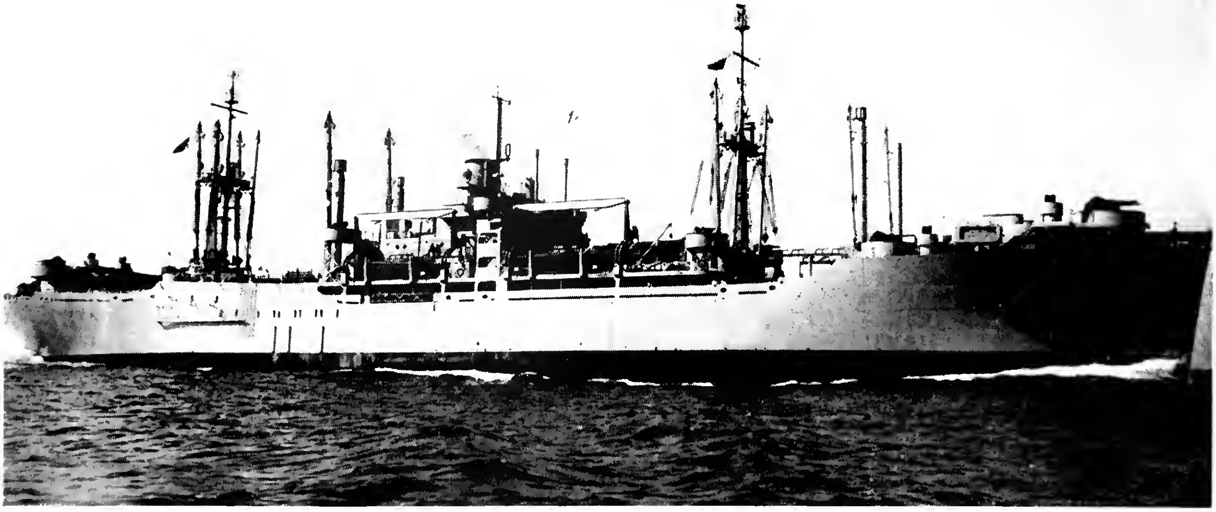
The larger sections of the ships are not fabricated at the Long Beach shipyard, but are shaped and welded together at the Baldwin Park plant, where the ever present congestion of a harbor area is not encountered. These forepeaks, double bottoms, fantails, side shells, deck sections, bulkheads and deckhouses, are transported to the shipyard as they are needed and are swung into position on the ship as soon as they arrive.

Looking forward to the post-war period, this firm has actively engaged in the design and construction of tuna clippers to meet the needs of Pacific Coast fishermen. They have standardized on a design by G. Bruce Newby of Long Beach, which calls for an all welded steel hull, 125 feet long by 27 feet beam, by 14 feet depth, and will be powered with twin 840 horsepower six cylinder supercharged Superior diesel engines, makgin them the fastest clippers in the California fleet. This hull will carry 270 tons of refrigerated fish. Four of these clippers are on order, the keel for the first having been laid about October 1, to be finished before January 1, 1945. The first three will go to Captain Manuel Sousa, Capt Manuel Balelo and Captain Frank Perry respectively, all of whom are under contract to fish for the French Sardine Co. at San Pedro and the High Seas Tuna Packing Co. at San Diego.

President of the corporation and actively engaged in the shipyard is B. J. Ukropina. Other company officials are Steve Kral, Tom Polich and E. E. Hall, vice presidents. Top control of the Steel Shipbuilding Division includes Cecil W. Drake, administrative manager; F. O. Miellem, works manager; Roy Chinnici, superintendent; Paul Preston, chief engineer.

At left: Miss Marion Marks acted as maid of honor for Mrs. John Kilpatrick, sponsor of FS-547.

Reading from left to right: Mrs. E. E. Hall, Mrs. A. Anderson, B. J. Ukropina, president of United Concrete Pipe; E. E. Hall, Mrs. B. J. Ukropina, Mrs. Robert Smither, Dr. Robert Smither, Mrs. B. W. Bennett and Captain B. W. Bennett.



First Transports

Following the construction of 368 cargo vessels—most of which were Liberty freighters—California Shipbuilding Corporation's 35,000 workmen began work early last summer on their most difficult job to date—the building of 30 attack troop transports for the United States Navy.

An Top:
After running through all her trial paces the U. S. S. Haskell was delivered to United States Navy recently.

Above:
Calship division managers group for a picture after okaying the sea trial performance of their most intricate ship, the transport U. S. S. Haskell. Left to right are: Stuart Allen, hull divisions manager; Elmer Casey, manager of the shops and assembly line; J. W. Komes, assistant production manager; and Kohn Kiely, manager of the outfitting division.

Right:
Testing anchor winches on the trial run of the U. S. S. Haskell.

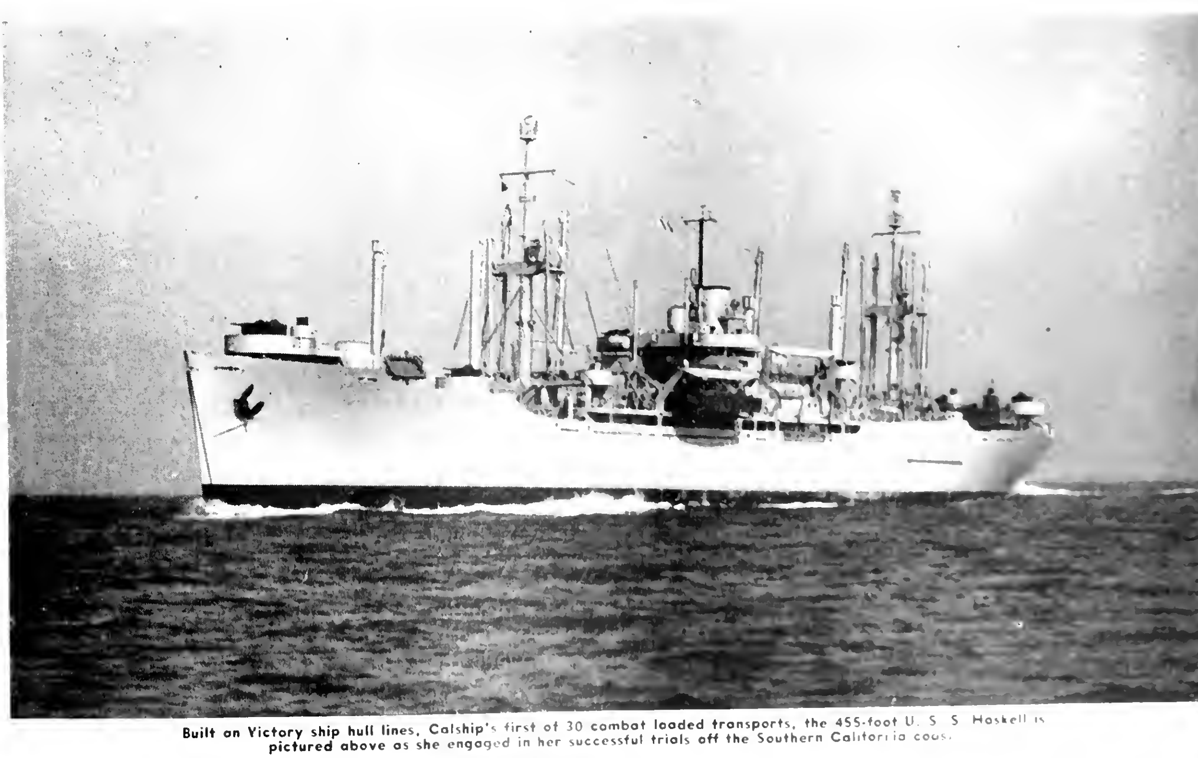
In early September the U. S. S. Haskell, Calship's TR-1 was ready for sea trial and delivery. Top Government priorities in building material and labor, coupled with Calship's reputation for getting the job done, promised early delivery of the Haskell's 29 sister ships, in time to maintain the Pacific War Timetable of Invasion.

Designed especially for landings in the far Pacific, the U. S. S. Haskell carries a boat-deck full of invasion barges and her one cargo hold full of equipment to outfit the amphibious units. In the aft deck house is a boat engine repair shop in which the motor of each landing barge may be tested immediately before it is to be used.

Heavily armed, the transport is equipped to carry more than 1000 troops and a Navy crew of several hundred. Ventilating the many troop berthing compartments, crew and officers quarters called for more than twice the sheetmetal work required for any other Calship-built vessel. The extremely intricate wiring for the communications, radar and power systems required many weeks of overtime work by the electrical department.

Hoisting the clean sweep broom after the sea trial of Calship's first transport are A. O. Pegg (left), consultant to the Calship Operating Committee, and Robert Gerhart, who served as outfitting manager at Calship through several months of transport construction.

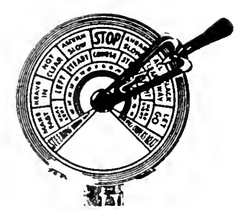
Attack Troop-From Calship



Built on Victory ship hull lines, Calship's first of 30 combat loaded transports, the 455-foot U. S. S. Haskell is pictured above as she engaged in her successful trials off the Southern California coast.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

Shipboard Gas Hazard

The atmosphere in which life is sustained must always contain a fixed percentage of oxygen, and even a relatively slight mixture of certain other gases may mean injury or death. This fact is often overlooked in everyday life, since we move in an atmosphere which is constantly being revitalized by the dispersal of these dangerous gases and the addition of the necessary oxygen.

In all seagoing vessels there is a considerable number of enclosed and sometimes unventilated spaces; namely, double bottoms, holds and tanks which may carry cargo of such a nature that it may generate dangerous gases or consume the oxygen present in the air. This oxygen may even be removed by the effect of the iron and steelwork itself, thereby creating conditions not usually found on land. Sometimes the presence of seemingly unimportant quantities of certain solid or liquid substances consume this oxygen in the atmosphere to a point where it is dangerous. Such conditions must always be taken care of by the ship's officers, who are required to make suitable tests and take the necessary precautions.

In double bottom and peak tanks of merchant vessels, which at times had been filled with water for ballast or other purposes, casualties have been known to occur. Also tanks which have been hermetically sealed for comparatively long periods, even though they had contained no oil or other cargo, may be dangerous to enter. Where tanks have been painted on the inside, left empty and sealed hermetically for long periods of time, then opened and entered, accidents have occurred.

Oxygen deficiency seems to be the major cause of most deaths which occur from entering empty peak and double bottom tanks of merchant vessels. It has been found that death occurs in from six to eight minutes when the oxygen in the air drops to 6 per cent by volume. The average man loses consciousness when the oxygen content drops to 8 to 11 per cent and death may follow. When the oxygen is as low as 16 per cent, men can still work but with decreased efficiency, 21 per cent by volume being the normal amount of oxygen which free air should contain.

Several fatal accidents have occurred on naval vessels where men entered tank spaces which had been coated with red lead and left hermetically sealed for some considerable time. The inquiry disclosed that the paint had come off in a number of places, allowing the inclosed air to come in contact with the metal. Since carbon monoxide was found in the blood of the men who died, it seems quite probable there was a deficiency of oxygen and a quantity of carbon monoxide present in the tank space. In these cases, while the cause of the accidents was primarily carbon monoxide poisoning, the absence of the required amount of oxygen also contributed a great deal to the deaths.

In the process of rusting, moist steel surfaces consume oxygen. In fact, in one case, the oxygen in an empty tank was found to be as low as 4 per cent. Cases are on record where a man has collapsed within two feet of the manhole and a second man who went to his rescue suffered the same fate, both being found dead when reached by the rescue party. There is no way to detect oxygen deficiency in the appearance or odor of the air in such tanks, which makes this condition extremely dangerous, since one, on entering a tank may lose consciousness and collapse almost immediately, without any kind of previous warning. No attempts at rescue should be made unless the rescuers are equipped with hose masks and self-contained oxygen respirators supplied with oxygen from compressed oxygen or chemical mixtures.

Oxygen deficiency may also occur on shipboard due to toxic conditions which may arise from the decomposition of organic substances. This condition, which may or may not be accompanied by the presence of carbon monoxide, is perhaps responsible for most of the gas hazards encountered. No casualties—as far as is known—have resulted from the so-called sewer gas which arises from foul bilges, although it contains carbon dioxide, ammonia and other organic decomposition gases.

Rubber latex carried in bulk on shipboard seldom has been known to generate toxic gases, sufficient to cause danger to life, although a case is on record where deaths have resulted from men entering a tank which on the previous voyage had been carrying latex. On investigation it was discovered that, after the latex was discharged, the tank was washed out with water, in order to remove the residual ammonia which substance acts both as an anti-coagulant and a preservative to the latex. Upon completion of some necessary repairs, the tank was closed up and the vessel sailed for the Philippines where, upon arrival, the tank was opened up. From all available evidence it was assumed that the most important factor which contributed to the cause of the deaths was the lack of oxygen in the atmosphere of the tank. It seems that the real rubber content of latex oxidizes very easily, forming a by-product containing up to 40 per cent of oxygen, and in the absence of the

ammonia, this latex had putrified, thereby causing a very rapid depletion of the limited oxygen supply.

Among cargoes of plant origin which give off toxic gases and absorb oxygen are listed the following: orange and similar fruit products, potatoes, linseed cake, rosin, tobacco. These may cause a more or less dangerous increase in carbon dioxide content of the air, when aided by moisture and may even generate carbon monoxide under certain circumstances. Rice bran is another commodity which, when heated spontaneously in a ship's hold, has resulted in serious loss of life. A ship with a cargo of coffee beans and hides ran aground, slightly damaging the cargo with water, and four men who entered the hold died as a result of the atmospheric conditions there.

Tanks, in which whale oil had been carried and had not been cleaned, have been entered by several workmen in the course of their employment, only to meet their death. The breaking of the crust formed over the whale oil residues evidently released poisonous carbon monoxide gases which were the result of the fermentation of the residue.

Another oxidizable and combustible cargo, which absorbs atmospheric oxygen is coal. It may give off carbon dioxide methane and carbon monoxide, even before the temperature rises to the burning point.

It is required that all fuel bunkers and other tanks which have carried petroleum products in bulk be thoroughly tested before being entered, since both toxic and explosive gases arise from these products.

The inhalation of small quantities of petroleum vapor produces mild exhilaration. Other effects may develop, such as irritation of the eyes and severe headache, and with increased concentration, the intoxication is followed by unconsciousness and ultimately death. Slight concentrations of petroleum vapor, called pentane for simplicity, may be inhaled for an hour without serious effect, but very unpleasant reactions have been observed in people exposed to concentrations as low as 0.09 to 0.13 per cent. Common places, where men have entered to do repair work to oil lines, and a short time later have been found dead, are pump rooms and cofferdams adjacent to oil tanks.

Only trained men, using tried and tested methods, should be permitted to make the inspection of tanks and tests of explosive gases or vapors. Sometimes a specific poison, hydrogen sulfide, may be present in the petroleum vapors, but since it is very difficult to detect by smell, a special test should be made if there is any reasonable suspicion of its presence.

Serious cases of lead poisoning, several of which have been fatal, resulting from the operation of tank vessels, has prompted the Bureau of Ships of the Navy Department to issue a new engineering circular upon this subject. Following are excerpts from this circular:

The hazard of lead poisoning is present whenever men enter a stowage tank which has contained leaded gasoline. Tetraethyl lead compound added to gasoline to increase its antiknock value is toxic and may enter the body through inhalation, skin absorption or by way of the digestive tract. Serious cases of lead poisoning, several fatal, have occurred from exposure in tanks that have contained leaded gasoline, but these have occurred only when such tanks were cleaned without following recommended safeguards.

A tank which has contained leaded fuel may offer serious danger of exposure to lead poisoning, due to volatile organic lead compounds in sludge and scale which may be present even after flushing with water. A further danger exists from the inorganic lead compounds in the water bottoms and sludge resulting from treating operations other than tetraethyl lead. It is obvious, therefore, that no stowage tank used for leaded gasoline may be assumed to be free from a lead hazard, even though it is free of gasoline vapor as determined by a combustible gas indicator.

The Ethyl fluid may be trapped in the bottom sediment of leaded gasoline stowage tanks, and the agitation of this sediment of sludge, when cleaning the tanks, allows it to vaporize. This vapor may then be present, even though the tank has been gas-freed, as determined by the combustible gas indicator. This condition will exist until the tank has been thoroughly cleaned.

Future changes in the composition of high octane gasoline will tend to increase the toxic hazards.

The hazards of fire, explosion, and asphyxiation are also present.

A blower type or positive pressure air line hose mask should be worn by any person who enters a tank which has contained leaded-gasoline but has not been thoroughly cleaned. This applies not only to tank cleaners but to all others who go into the tank for any purpose.

All workmen must wear clean clothing from the skin out: also acid-proof gloves and rubber boots of good quality and in perfect condition.

Clothing must be changed and laundered, and a bath must be taken every day, either at the end of the day's work or when the job is finished. If at any time clothing gets soaked with gasoline or sludge, the workmen must bathe at once and put on clean clothes. At the end of each day, and after the job is completed, masks, boots, gloves, and tools must be cleaned.

Proficiency in Communications Required

Deck officers of vessels in the United States merchant marine departing from United States ports will be required after January 1, 1945, to be proficient in wartime merchant ship communications, under Subchapter O — Regulations Applicable to Certain Vessels and Shipping During Emergency, according to an announcement just made by the Commandant of the Coast Guard and published in the Federal Register of August 1, 1944. This amendment to the regulations provides that officers may have their certificates endorsed "Qualified in wartime communications" upon submission of acceptable evidence of their proficiency. Certificates of proficiency in wartime merchant ship communications issued by the Navy may be accepted by the Coast Guard Shipping Commissioners and license issuing officers as satisfactory evidence.

The evidence of proficiency in wartime merchant ship communications required by the provisions of certificates of inspection shall be exhibited to the Coast Guard Shipping Commissioner at the time of signing on the vessel.

Certificates of inspection of certain vessels will be deemed to include the provision: "The licensed deck officers, including the master, required by this certificate of inspection shall possess evidence satisfactory to the Commandant of the Coast Guard of proficiency in wartime merchant ship communication."

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco 11, California

Steering Mechanisms

II—STEERING GEARS (Continued)

In previous articles we have discussed the following important points relative to ships' steering gear:

When extreme or maximum torques (turning effort) are required at the rudder post, we may tolerate slow speed of turning, and when only light torque is needed (fair weather, slow ship speed, near midships position), we desire high speed of movement, so that the product of speed and torque are nearly a constant value over all conditions of torque.

The driving motor is fundamentally a nearly constant speed source of power.

The hydraulic system is nearly ideal for transmission between the constant speed motor and the adjustable speed rudder, because (a) ease of adjustment of speed, (b) delivers the large torque by hydraulic rams, which, by mechanical gearing would require huge gears and a large speed reduction in the gears.

Furthermore, by using the variable stroke hydraulic pump (Waterbury variable delivery or Hele-Shaw pump), not only can delivery be adjusted from zero to maximum, but more important, the often overlooked point, at low delivery of fluid we obtain increased ratio between motor torque and hydraulic pressure, and at high delivery we obtain decreased ratio of torque to pressure but gain increase of ratio between fluid delivery and motor speed. This is much the same as the change in the position of the fulcrum of a lever, which we move up close to the load end for heavy lift at slow speed, and move away from the load end when we need only light load but want speed of lift. It should be noted that hydraulic jacks or other systems of hydraulic transmission do not provide this variable ratio of torque and pressure.

Having established the variable delivery adjustable stroke pump, or the A end of the hydraulic system, the means of driving the load may be a hydraulic motor or B end built onto the pump, or a set of two or four hydraulic rams attached to the tiller. This method is preferred for steering gears. The B end hydraulic motor is popular for other drives of many kinds found particularly in naval ships.

The accompanying figure is illustrative of a typical control for the hydraulic system, in which the A end of the Waterbury pump is used in connection with hydraulic rams on the tiller.

There are two general types of control for steering and other motions as follows:

In the **non-follow-up** system, the master control element is moved toward right or left, and the rudder moves accordingly, as long as the master element is so displaced from neutral or mid-position. Therefore the rudder would move to its limits where it would be cut off from further travel by limit cutoff and bumper stops, if the master element is left in a displaced position. It must, therefore, be returned to off or mid-position when the rudder has made its required travel. The master element has only three positions, that is, move left—off—move right, and is usually spring returned to off, if the hand is removed from its handle.

In the follow-up system, the master element has a large number of positions and is left in any one of them. The rudder is caused to move to a position corresponding to the position of the master element, where it cuts itself off. This is the popular ships' steering system, in which the master element is the steering wheel. The position of the steering wheel is transmitted to the steering control by any means, such as ropes or cables, but more generally, by two pipes carrying hydraulic fluid from a cylinder operated from the fluid displacement, which operates in turn its piston and a rack or other mechanical connection. This is usually termed the hydraulic telemotor.

The figure illustrates the system on the Stetson-Ross Machine Co. electro-hydraulic steering gear.

The follow-up system usually involves a differential gear or mechanism in which displacement from a control shaft displaces a differential unit and the resulting displacement from the machine controlled, in turn, moves the differential back to its normal or off position. That is, the machine cuts itself off after traveling a required amount.

The purpose of the differential is to prevent a continuous movement of rudder when the valve control is shifted, by providing a feature called a "follow-up." By connecting one side of a differential to the rams, and the other side to after telemotor, it becomes possible to limit the travel of rudder to an amount exactly proportional to the movement of steering wheel. By high grade mechanical workmanship in the parts of telemotors and differentials, it is possible to obtain very accurate control of the rudder.

Description: Referring to the diagram, the lower half shows a sectional view of the differential with the case broken away so that the component parts can be readily understood. Briefly, the operation is as follows:

When the telemotor is actuated by movement of the steering wheel, rack 100 causes shaft 78 to revolve, turning bevel gear 103. The rams of the steering gear are connected to rack 10 thereby causing shaft 84 driving gear 85, which revolves freely on a roller bearing around the sleeve carrying cam 79, to rotate when the rams are in motion. Gear 85 is attached to a

bevel gear which meshes with pinion 102, but on the opposite side from bevel gear 103.

Pinion 102 is mounted on a roller bearing stud attached to the free sleeve carrying cam 79, therefore if either the telemotor or the rams are placed in motion the cam is caused to rotate. When the steering gear is at rest, that is, no motion taking place on either the rams or the steering wheel, it is obvious there would be no oil flowing through the pump due to the fact cam 79 would be in neutral position, and tilting box 105 in the pump would be in a true vertical position and not in the angular position as shown in the upper part of the diagram.

If, however, one moved the wheel, cam 79 would be caused to rotate and the proper flow of oil would be produced to move the rams and swing the rudder in the desired direction. The arrangement of the differential being as it is, the movement of the ram returns the cam to its original position when the ram has traveled a distance exactly proportional to the number of degrees the wheel has been rotated.

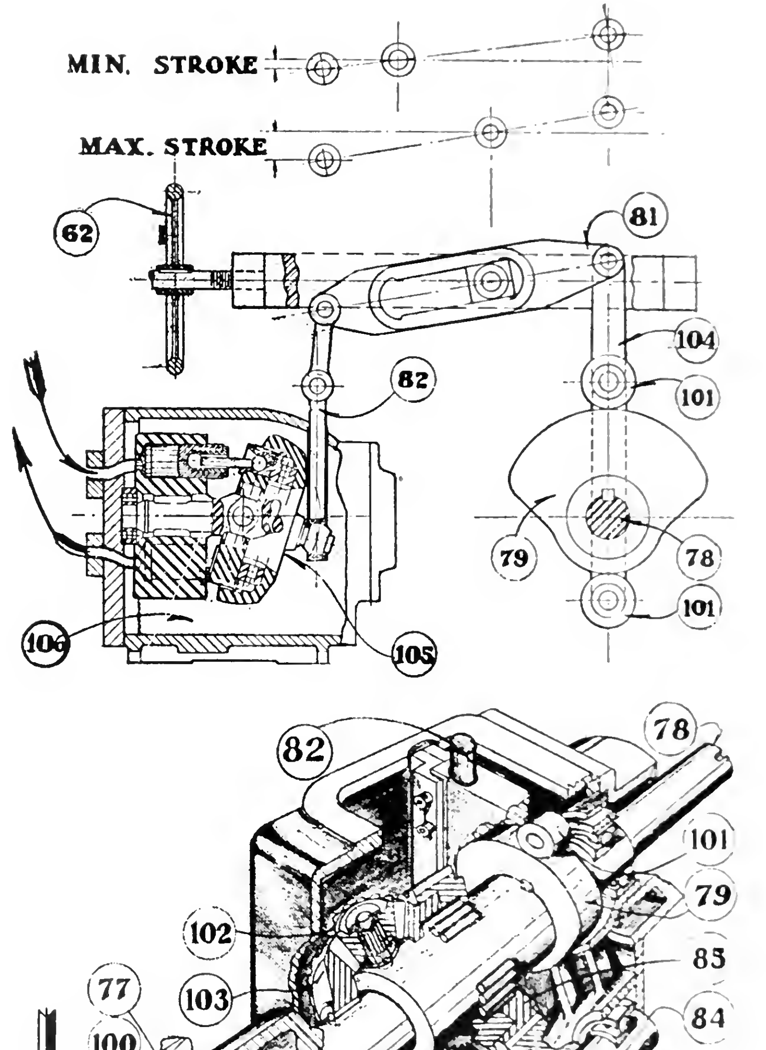
Follow-up, then, is the term applied to the function of the differential, referring to the rams following in proportion the movement of the wheel.

Storage motion is a term applied to the action of the cam that moves the pump control one way or the other a definite amount when the wheel is moved, thereby storing up the ability to return the pump control to neutral when the rams have moved a definite distance bringing the cam back to its initial position.

The volume of oil delivered by the pump is regulated by the amount the control is moved. Therefore, it seemed desirable to provide some means of regulating the stroke in order to limit the volume delivered by the pump. Conditions such as operation on one pair of ram cylinders, or some other desirable change in rate of rudder movement, might be necessary.

Referring to the upper part of the diagram on this page it will be understood that wheel 62, if rotated, shifts the fulcrum point of lever 81 actuating pump control 82, thereby adjusting the travel of slide 104 (caused by roller 101 following cam 79 in its rotation). At the top of this diagram is sketched the relative positions of lever and fulcrum at the two extremes of this adjustment.

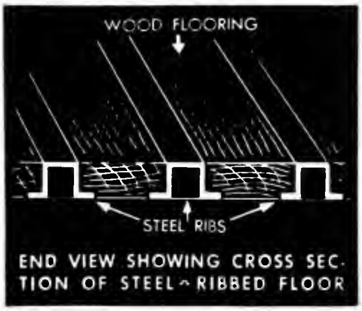
When setting the adjustment of pump stroke, speed of rudder movement must be taken into account. The most practical setting is the one which will keep the pump stroke and oil delivery at the lowest point at which the rudder will provide satisfactory control of the ship. This will average approximately 75 to 80 per cent stroke.

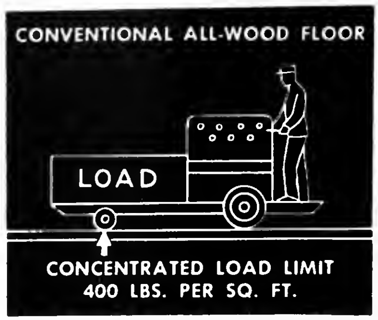


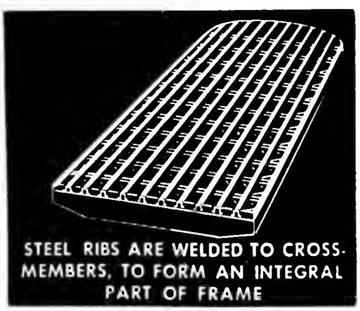
Diagrammatic illustration of pump stroke adjustment feature operating in conjunction with differential control shown in sectional view

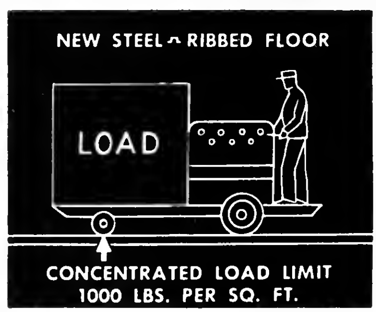
Keep Posted!

NEW EQUIPMENT AND MACHINERY FOR YARD, SHIP AND DOCK









Steel-Ribbed Trailer Floor

A wartime engineering development of interest to all trailer users is a new and patented steel-ribbed floor just announced by the Fruehauf Trailer Company.

The steel-ribbed design is a radical departure from the usual "tongue-and-groove" type. Hardwood floor boards are bolted down between ten flanged steel ribs, running substantially the full length of the trailer. The flanges of the ribs support the floor boards, and the steel joints are flush with the top of the floor, forming a smooth, long-wearing surface. The illustration herewith shows plainly the method of construction.

The ribs, which are of high-tensile steel, are welded to all chassis cross-members and form an integral part of Fruehauf's airplane-type frame construction. Being stronger than any individual board, the steel ribs not only strengthen the floor but give added strength and rigidity to the chassis by serving as transverse braces to the cross-members.

Besides increased strength and rigidity, the servicing problem is greatly simplified. Any single board can be replaced without disturbing the rest of the floor, since there are no "tongues" or "grooves" to worry about, and matched lumber is not required.

Company officials call attention to the fact that this feature might logically be held for post-war trailers, but in line with the company's policy of giving trailer users the benefit of all improvements in design and construction as soon as they are perfected, the new floor is being immediately incorporated in current production of civilian trailers.

Lignum Vitae Blocks

The Davis Hardwood Company, Bay and Mason Streets, San Francisco, now carries, in addition to Lignum Vitae Logs, a complete stock of Lignum Vitae sawn blocks. The blocks are boxed heart timbers, coated with clear shellac and are stocked in two bracket sizes: 7″ and up by 7″ and up, by 24″ and longer in length; and 10″ and up by 10″ and up by 24″ and longer in length. The grade of the blocks is in accordance with the U. S. Navy Department specifications 39L2d, type "B-Block."

This block form of Lignum Vitae is proving very satisfactory. It eliminates considerable waste. There is saving in transportation costs and labor. Blocks furnished in this form reduce waste in the elimination of sap and irregularities in the log, and save operations in the manufacture of Lignum Vitae stern tube bearings for ships.

KEEP POSTED

The manufacturers of the new equipment announced in this department will be pleased to furnish complete details without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment as reviewed in your

....issue.

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(Identify by name of manufacturer and machine)

NAME..

BUSINESS..

ADDRESS..

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Diesel air filter.

Diesel Air Filter

Entirely new in design, weighing 46½ lbs., and with a capacity of 2200 to 3200 cfm, the Far-Air Diesel Air Filter for diesel engine intakes is announced by Farr Company, Los Angeles, California, manufacturers of Far-Air Filters.

As illustrated, the new filter is complete and ready for attachment. It is composed of four separate filter panels of characteristic Far-Air design — herringbone channeled fine wire screen—and 2⅛ inches thick. They are mounted with spring clips on a steel frame, permitting easy removal for cleaning or changing while the unit is in normal operation.

Detailed specifications are as follows:

Capacity	2200 cfm to 3200 cfm
Air velocity	435 fpm to 635 fpm
Static pressure (clean)	0.15" to 0.29"
Overall size	14" x 14" x 22⅜"
Weight—complete unit	46½ pounds
Weight—less filters	18½ pounds
Filter size	8¾" x 22" x 2⅛" (actual)

Other sizes or capacities are also manufactured.

Cat's Eye for Boilers

The "Cat's-Eye," developed by the Ess Instrument Company of Fort Lee, New Jersey, is designed and constructed so that shadows of the smoke-haze and the flame characteristics in the firebox can be seen, at a glance, from any point in the boiler room.

The Cat's-Eye is safe, has no glare, doesn't get hot and will not permit flareback. By looking at it the operator will see, at a glance, the furnace flame, its turbulence and its smoke-haze and be able to make the necessary adjustments in fuel-air ratio without leaving his station. This applies to one or a number of boilers.

The center of the "Eye" is clear to show the flame in all of its natural color and the outer frosted portion is a sensitive shadow-screen reflecting the slightest change in combustion.

Cat's-Eyes are easily attached to burners or peep-holes; no adjustments, no charts, no electrical hookups. They are made in three models: "A"—with external lugs; "B"—with internal lugs and "C"—which is threaded for pipe extensions. All models are identical in size and in operation.

Cat's-Eye for boilers.

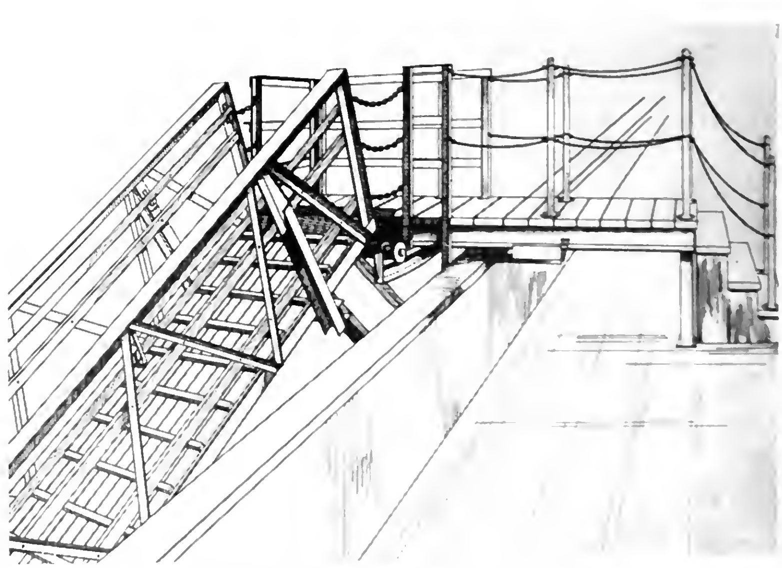
New Steel-Type Gangway

An improved type of ship's gangway — designed with an all-steel frame that is lighter, safer and more flexible than the usual ship-to-shore bridge— has been developed by Todd Shipyards Corporation engineers and is now in operation at the Corporation's Hoboken Division yard, Hoboken, N. J., after successfully meeting stringent tests. A number of the new gangways will be made, according to present plans, and will replace old-style wooden types in all Todd shipyards.

Principal advantage of the new bridge, Todd engineers point out, is its lighter but stronger construction and its superior maneuverability. At its upper end, the bridge is clamped to the ship's gunwale and works on a pivoted axle with a wheel arrangement on one side. This device automatically "takes up the slack" when possible storm conditions or unusual tides may cause a ship to shift, subjecting the gangway to strains and stresses which conceivably might prove dangerous.

At its lower end, the bridge rests on a small set of wheels, providing extra mobility when needed. The bridge also is equipped with a small set of wheels at its center, permitting it to be moved freely about the yard when shifting from one job to another becomes necessary.

The bridge in use at Hoboken is 54 feet long and can serve a ship with gunwales as high as 25 feet above the pier. However, it is planned to make the gangway in a 36-foot size also, providing safe boarding facilities for a ship with gunwales reaching 18 feet above pier level.



Topside of new Todd gangway, showing close up of pivot device.

Portable rivet heating forge.

Portable Rivet Heating Forge

A new small gas-fired rivet heating forge convenient to get into confined spaces is now being manufactured by James H. Knapp Co. of Los Angeles.

It operates on compressed air and natural gas, and is supplied complete with burner and necessary control valves.

The heating space is 8 inches diameter by 7 inches deep, and the bottom lining of chrome refractory will not slag with rivets.

Weighing 85 pounds and fitted with lifting hooks for easy moving, even when hot, the novel design permits easy charging and removal of rivets without discomfort to the operator.

It can also be furnished for operation on light oils.

Safety Device for Crane Booms

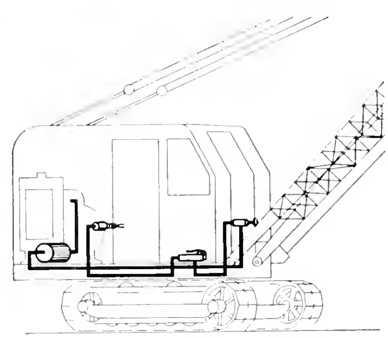
Providing positive protection against costly accidents resulting from raising crane booms beyond their safe elevation, the Thomas Automatic Boom Stop Control is an air or vacuum-operated system which disengages the main drive clutch instantly the moment the boom is raised above safe limits.

The limit-control valve, mounted on the cab frame in line with one leg of the boom, is positioned to operate on contact with the boom as the boom approaches its maximum safe elevation. Operation of the valve immediately releases the air or vacuum pressure in the system, causing the spring-loaded clutch booster cylinder to disengage the clutch and stop further boom raising. Unlike mechanical stop devices, the Thomas control stops the boom without shock and thus places no dangerous strains upon heavily-loaded booms.

Approved by the California Industrial Accident Commission, the Thomas control has been installed on over 200 cranes operating in shipyards, army depots and industrial plants throughout the country.

This is manufactured by the Industrial Equipment Company, Emeryville 8, California.

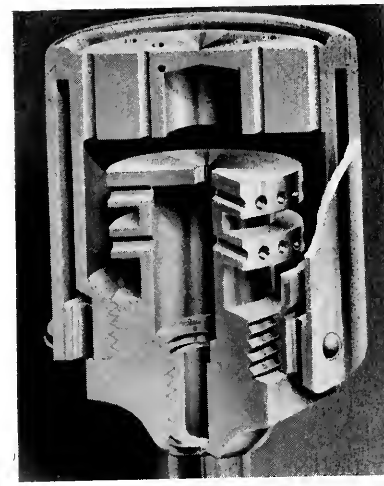
The new safety automatic boom stop control.



Multi-Flame Heating Nozzles

A new heating nozzle, designed particularly for use with oxygen and the liquefied petroleum gases or natural gas, is now offered by Victor Equipment Company, San Francisco, California. This heating nozzle fits all Standard Victor welding torch butts but can also be sold complete.

The design features incorporate an outer air mantle to protect the nozzle head against deflected heat. Its internal design is such that the cool and pre-mixed gases carry away a substantial amount of accumulated heat, and in doing so become efficiently preheated for proper combustion. Similar multi-flame heating nozzles are also available in numerous sizes for use with oxy-acetylene.



Multi-flame heating nozzle.

The larger multi-flame heating nozzles are recommended for flame priming and descaling in inaccessible areas. All of them can be employed for various silver brazing operations, preheating and bending. Multi-flame nozzles are a most useful adjunct to all good welding torches.

Mobile Crane-Loader

This compact loader, nimbly mounted on driven front wheels and rear caster, is capable of lifting up to 5 tons with its telescopic 12-18-ft. boom, toting load at speeds up to 12 mph and swinging full load 90° to either side without need for outriggers. Ability to turn in as little as 10½ ft., and pass through 6½' x 8' doorway, facilitates its use on pier or dock and in warehouse or shipyard. Maximum drawbar pull of 6500 lbs. is available for pulling or pushing loaded trailers or spotting cars. Boom load is centered on driven front wheels to give maximum stability and traction. Four transmission speeds are provided for all boom operations and travel.

All boom operations may be controlled separately or simultaneously. Internal expanding friction clutch, of same type used in largest shovels and cranes, controls boom hoisting and topping with mere finger pressure. Instant automatic safety brakes are provided, and no part of load or boom is ever above operator. Tier loader with fork or platform can be supplied in place of boom.

This loader is built by The Jaeger Machine Company, Columbus, Ohio

Victor Distributes Ransome Equipment

Ransome Machinery Company, subsidiary of Worthington Pump and Machinery Corporation, and Victor Equipment Company of San Francisco, now bring to West Coast manufacturers the Ransome welding positioning equipment.

Well-designed welding positioners have proved their ability to step up welding production by as much as 50%, with a tangible decrease in electrode waste of up to 7%. Position welding saves up to 50% of labor costs, produces better, smoother, stronger welds, and reduces accident hazards and crane service.

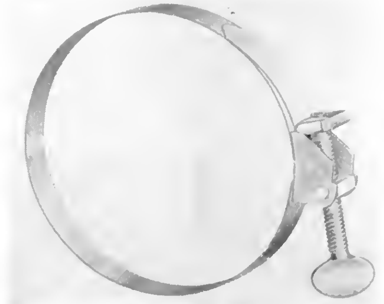
The Ransome line covers virtually the entire range of weldments, from hand-operated positioners to models up to 40,000-lb. capacity. These positioners have also proved of great value in flame hardening and hard surfacing operations.

Interested engineers may contact the Ransome factory representative, H. L. Heakin, 224 Townsend Street, San Francisco 7, or Victor Equipment Company.

A typical Ransome positioner having a 500-lb. capacity.

Flexible Universal Clamp

A new flexible-band type, corrosion-resistant clamp particularly suitable for marine use is announced by Marman Products Co., Inc., Inglewood, California. At the Naval Aircraft Factory this clamp passed all requirements of AN-FF-C-406a hose clamp specification, including accelerated salt water corrosion test, maximum load, re-use, average deflection, wrench torque, and leakage pressure tests.



New flexible-band type clamp.

Special construction features include a patented swivel-action nut which rocks on swivel pins and tips down when the thumb screw is tightened. This cinches the band under all conditions of torque adjustment and pressure, and prevents slipping. The flexible band conforms evenly to the hose contour and does not pinch the hose or distort the parts. The clamp is vibration-proof and remains tight under all conditions. Rugged construction permits re-use without efficiency loss. The band and saddle are of stainless steel. The screw, pad, and nut are made from plated alloy steel.

The clamp can be easily installed or removed without tools. Three standard sizes are available to cover the entire range up to 3-9/16 inch hose diameter.

Fairbanks-Morse Millionth Magneto

Magneto Number 1,000,000 came off the production lines recently at the Beloit works of Fairbanks, Morse & Co. Independently an industry within an industry, the Fairbanks-Morse Magneto Division maintains strongly its individual existence, in spite of the fact that its 400 employees are lost among the 7000 who populate the Beloit plant and build diesels, locomotives, pumps, motors and farm equipment.

Colonel Robert H. Morse, president of Fairbanks, Morse & Co., receives the millionth magneto just presented him by A. C. Howard, general manager of the Beloit Works, and A. E. Ashcraft, vice president in charge of Manufacturing.

The Magneto Division was born just ten years ago to face the job of streamlining and putting into production an item of electrical equipment.

This division has hummed through ten years of steady growth and its first million magnetos, and is proud of its success. In addition to its research and manufacturing operations, it maintains its own sales organization and a network of 1200 service stations spotted across the United States and Canada.

Good customers for this Super Spark Magneto are Allis-Chalmers and Minneapolis-Moline, who use them as standard equipment on tractors and other farm machinery. F-M Magnetos go to engine manufacturers and to the replacement shelves of machinery dealers—and, of course, many are used by Fairbanks-Morse on their own farm and oil field engines.

New Marine Strainer

A new high-pressure strainer for marine pipelines, designed to accommodate right angle line turns, may be installed directly upon fitting or pump it is to protect from foreign matter carried by fluid. Extremely sturdy, the new product has a cast steel body and cover assembly—bolted cover, which contains a regular blow-off tapping, being sealed with a copper asbestos gasket.

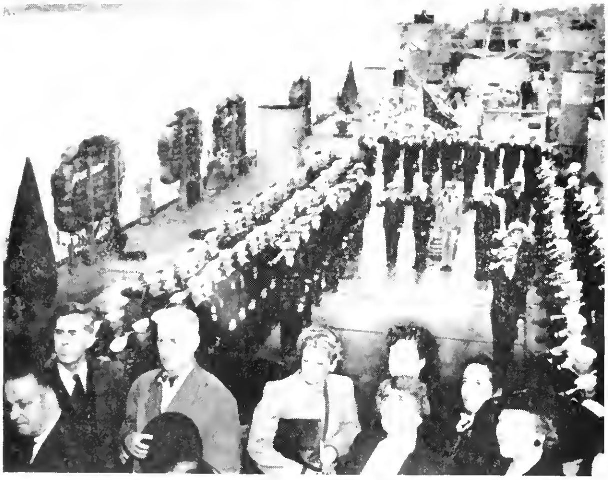
The manufacturer claims an increased level of efficiency for this strainer based on the design of strainer and proper perforating in relation to pipe size, resulting in a noticeable decrease of friction loss. Maker recommends that these strainers be used in sets of two with valves, whereby continuous pipeline flow during cleaning periods and operations may be achieved.

Specifically for high pressure applications in lines carrying fluids or gases, it is being regularly supplied to users who specify basket perforations, flanges and finishes to meet specific service conditions. This strainer is made by the J. A. Zurn Mfg. Co. of Erie, Pa.

On the Ways—
SHIPS IN THE MAKING

INGALLS LAUNCHES TRANSPORT

At the launching of USS Sea Falcon, Mrs. Arthur Charles Rohn, wife of USMC's chief engineer, Washington, D. C., acted as sponsor (left to right: George Field, pub. rel. director; W. R. Guest, v. p.; Mrs. O. W. Page; R. I. Ingalls, Jr., vice chairman of the board; Mrs. Rohn, Mr. Rohn, and Mrs. A. C. Leigh.



WALLACE VISITS DRAVO

Vice President Wallace and his entourage stand to attention while the Navy "pipes the flag" to commission LST 795 at the Dravo Shipyards on September 30, 1944. The full complement of Navy personnel attached to the shipyards turned out in honor of the Vice President's visit.

Increase in September Production

A predominance of faster ships among the 124 vessels, aggregating 1,185,997 deadweight tons were delivered from the nation's merchant shipyards during September. The tonnage output had a slight increase compared to that of the August record.

Of the 65 faster vessels turned out, 34 were to meet needs of the Armed Forces. Among them were: 7 Victory cargo, 5 C-type cargo, and 19 tankers; of the slower type 43 Liberty cargo, 7 coastal cargo, 3 concrete cargo, and 2 concrete barges.

West Coast yards are in the lead with 45 vessels including seven Victory cargo ships to their credit. Eastern yards delivered 39 vessels, while the Gulf Coast delivered 32 and Great Lakes yards turned out eight ships.

Locality of nation's yards	Deadweight Tonnage	Percentage of Total Tonnage
East Coast yards....	410,300	34.6%
West Coast yards....	404,555	34.1%
Gulf Coast yards....	339,082	28.6%
Great Lakes yards....	32,060	2.7%

S. S. Buena Vista Hills Launched

Illuminated by searchlights which followed the ship as she slid down into the water, the S. S. Buena Vista Hills was launched on the dark night of September 30, at Marinship in Sausalito.

The 140,000 barrel turbo-electric tanker was christened by Mrs. Felix Kahn of San Francisco, wife of the president of MacDonald & Kahn, Inc. Mr. Kahn is also vice president and treasurer of Joshua Hendy Iron Works, and director of Marinship Corporation. Matron of Honor for Mrs. Kahn was her daughter, Mrs. Richard Elkus.

Highest tribute to Mr. Kahn was paid by K. K. Bechtel, president of the Marin County shipyard, who was Master of Ceremonies. Painted on the bow of the ship was the emblem of the "Iron Men" of Joshua Hendy Iron Works, builders of marine engines and turbines at Sunnyvale, California.

This ship is one of 32 comprising the Hills class tankers named for important California petroleum fields. She is 523 feet long and powered by an 8250 horsepower motor.

TR-2, built at Calship, on her sea trials.

All-Day Battle of a Tanker and a Sub

The Yamhill, an Oregonship built tanker, out-maneuvered and outfought a Japanese sub in an all-day battle that ended when a Navy PBY plane approached and persuaded the Nip to dive. This disclosure is by the War Shipping Administration.

At dawn, the lookout in the after crow's nest was electrified out of boredom by watching the ship's wake—he shouted down: "Tin fish on the port side!" The clang of "general quarters" sounded.

In three minutes 80 merchant seamen and Navy gunners were at their stations. As they assembled, the wake of the "fish" showed the missile had missed the tanker's stern by less than five feet. Four more torpedoes came in quick succession. They all missed.

Suddenly the big black conning tower rose from the water. The battle was on. Soon one shot was too close and the sub submerged.

It was thought that that was the last of the sub, but half an hour later smoke was seen five miles away coming from its diesels. Just outside of the tanker's effective range, the shelling commenced again and continued for almost 12 hours, with the Japs continuously maneuvering out of the range.

At last the hum of motors of the Navy PBY coming in response to the distress signal flashed earlier by the radio operator, was the relief needed. The sub ceased maneuvering and dived. The day-long battle was over.

Picturesque view of one of Marinship's "Hill Class" tankers.

Photo courtesy Marinship

These flower girl twins, Linda and Sandra Warren, are daughters of Mrs. Frederick Warren who christened the SS Marvin McIntyre on September 21.

Navy Urges Full Speed Ahead

From two Navy sources recently came statements urging top speed in completion of 30 attack transports now under construction by the California Shipbuilding Corporation and emphasizing the immediate Navy demand for such ships to continue the advance of American forces in the Pacific.

In a speedletter from the Navy Bureau of Ships to the Calship, the Chief of Naval Operations directed that vessels of this type be completed at the earliest possible date and that "every effort be made to expedite all materials and components required for these ships."

"These ships are hereby placed in a special category over-riding all other ship activities and will remain in this category until completed," the Bureau of Ships letter said.

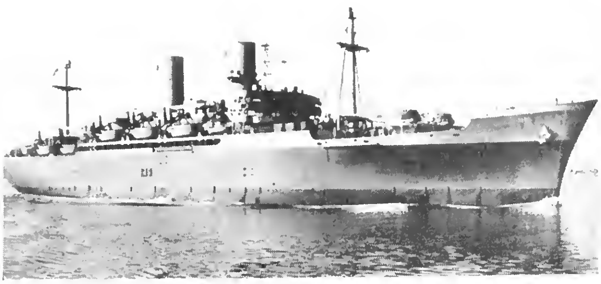
At the same time, in requesting Navy employees and shipyard workers to forego any holiday in celebration of European victories, Rear Admiral W. L. Friedell, U. S. N., commandant of the 11th Naval District, pointed out that numerous classes of ships essential to the success of amphibious operations are behind schedule in Pacific Coast shipyards.

Mrs. Kermit Roosevelt Christened Late Husband's Vessel

A Liberty ship named for the late Major Kermit Roosevelt, who died while serving with the U. S. Army in Alaska, was christened by Mrs. Kermit Roosevelt on October 5, as it slipped down the ways at the Bethlehem Fairfield shipbuilding yard, Baltimore, Maryland.

The choice of name was at the direct request of the merchant marine crew on the S. S. John M. Kinley, another Liberty ship, several of whom were recuperating from effects of enemy action and convoy fatigue at the USS-WSA rest center for merchant seamen on the Kermit Roosevelt estate, Oyster Bay, Long Island.

Dr. Blain and several members of the staff who cared for the crew during the convalescence, represented the rest center and the seamen sponsors at the ceremonies.



Ship without portholes, built at U. S. Steel's Federal shipyard at Kearny, N. J. This is the General Henry W. Butner, 20,000-ton, 600-foot troopship. The "windowless" feature means greater safety as a troopship.

"Kangeroos" Build Ships

Hard hitting American fighters have chosen picturesque names for their planes, ships and squadrons, such as the Memphis Belle, the Sad Sack and the Flying Tigers.

The shipbuilders at Marinship have adopted the same idea on the home front for their production groups.

So meet "The Kangeroos," the name now applied to the 250 men who comprise a specialty crew that are in charge of erection of a ship during the first week after keel laying. This crew lands more than 3000 tons of fabricated steel during the first week of construction.

Already well known to the 15,000 workers at the yard are the "Flying Gophers," who got their name from the fact that they work deep down in the ship's tanks. They follow the "Kangeroos" in working on the hulls, and undertake the erection of tanks which comprise the greater part of the 140,000 barrel tankers.

USS Montauk is one of more than 50 giant all-welded vessels built for war at the Ingalls Shipbuilding Corporation shipyards at Pascagoula, Miss.

Trial Master at Oregonship

Captain **Frank Gillard,** well known prior to the war as master of coastwise vessels, is directing all of the trials of the new tonnage turned out by the three Kaiser yards: the Oregon Shipbuilding, Vancouver and Swan Island plants in Oregon.

Captain Gillard is responsible for conducting the river trials, security of the vessels in the outfitting docks, tests on deck cargo and gear, anchors and steering gear, stowing and checking of lifeboats and the movement of ships after launching and before deliveries.

Serving under Captain Gillard, handling various duties, are: Captain C. A. Peters at Oregon Shipyards; Captain Forest Peterson at Swan Island, and Captain Jack Taylor at Vancouver yards

A Great Lakes Launching

Shipyard officials of the Leathem D. Smith Shipbuilding Co. were claiming the launching of the U. S. S. Rockdale, 338 foot Naval cargo vessel, the most perfect launching achieved by their yard to date.

The launching climaxed a program dedicated to the Maritime Commission. Sponsor of the freighter, fourth of a fleet of 20 the Smith yard is building for the Commission, was Mrs. William R. Crawford, Chicago, wife of the public relations director of the Maritime Commission's Gulf-Great Lakes regional office.

Addressing a crowd who witnessed the launching, Mr. Crawford pointed out that the yard has delivered into action a total of 23 million dollars worth of ships—nine coastal cargo vessels and eight modern freighters.

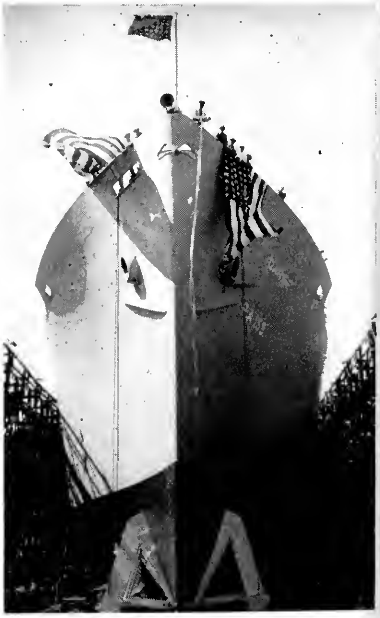
Consolidated Building M. S. Class

M. S. Diamond Knot, the first of a series of new-design long-range cargo ships to be built by Consolidated Steel Corporation, went into the water on September 28, in a spectacular sideways launching at the Long Beach shipyard. The M. S. Diamond Knot, together with a large fleet of her sister ships to be constructed by this yard, will be used by the Army and Navy for carrying supplies.

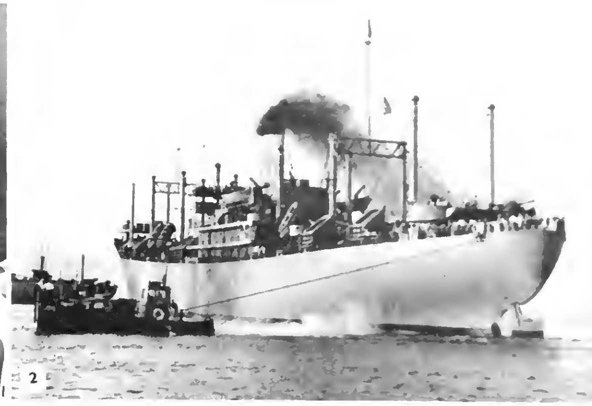
These coastwise cargo ships, designated as AV-1's, are 326 feet long, have a 50 foot beam and a gross tonnage of 4000.

The sponsor of this ship was Mrs. Walter Carter, wife of the plant superintendent of Consolidated's Maywood plant, where all ships for the firm's three harbor shipyards are prefabricated.

The AV-1's construction program adds yet another class of ship to the diversified armada being launched by Consolidated Steel. These craft include destroyers, destroyer escorts, frigates, Navy combat transports, Navy hospital ships, C-1 cargo and passenger vessels, and several types of mechanized landing craft.



USS Darke, ninth troop-transport, launched at the Oregon Shipbuilding Corporation on August 29.



Some California Launchings

Launched from September 15 to October 15:

Bethlehem Steel Company, Shipbuilding Division, San Francisco Yard

U. S. S. John W. Thomason, 2200-ton super destroyer, on September 30.

California Shipbuilding Corporation, Wilmington, California

The 13th combat loaded transport, S. S. Marvin H. McIntyre, on September 21.

The 14th of the above class, S. S. Attala, on September 27.

The 15th troop transport, S. S. Bandera, on October 6.

The 16th combat loaded transport, S. S. Barnwell, on September 30.

The 17th of the above class, S. S. Beckham, on October 14.

Consolidated Steel Corporation, Ltd., Wilmington, California

Combat transport, U. S. S. Cleburne, on September 27.

Combat transport, U. S. S. Colusa, on October 7.

M. S. Diamond Knot, first of the new-design long-range type cargo ship, on September 28.

M. S. Timber Hitch, 2nd of her class, on October 12.

Marinship Corporation, Sausalito, California

U. S. S. Tamalpais keel laid on September 18.

Navy oiler U. S. S. Anacostia, on September 24.

S. S. Buena Vista Hills, on September 30.

Navy oiler U. S. S. Caney, on October 8.

Tanker S. S. Coalinga Hills, on October 14.

Kaiser Company, Inc., Yard No. 3, Richmond, California

(12th Naval District launching)

Troop transport, U. S. S. General LeRoy Eltinge, on September 20.

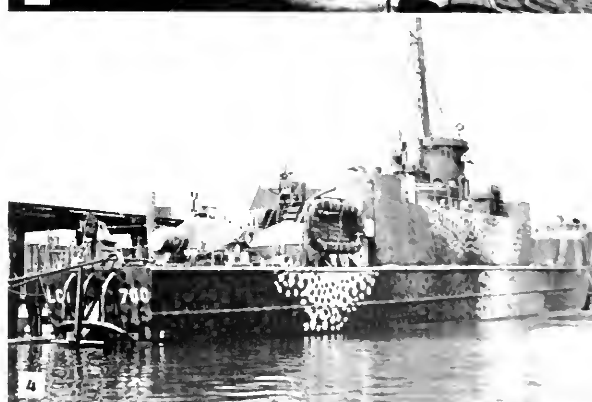
(1) Sponsor of the Navy oiler, USS Anacostia, was Mrs. Henry F. Bruns, wife of Rear Admiral H. F. Bruns (left), Superintending Civil Engineer for ten Western States for the Bureau of Yards and Docks; Lt. Mary Bruns of the WAVES; the sponsor; Mrs. Francis T. Cooper, another daughter, and Chaplain C. H. Foltz, Lt. USNR.

(2) Ingalls Sea Mule handling one of the 18,000-ton transports built at the Pascagoula, Miss., shipyard.

(3) M. S. Diamond Knot, the first of the USMC's new motorships, is shown in a dramatic sidewise launching view at the Long Beach shipyard of Consolidated Steel Corporation, Ltd.

(4) LCI (L) No. 700, recently assembled in record time of seven hours by George Lawley & Son Corp. of Boston.

(5) Five Navy oilers at the outfitting dock of Marinship.



Ship Vibration Problems

(Continued from page 83)

trailing edge region. The alternating "casting off" of vortices and their spacings depend on the velocity of the water as well as on the radius of curvature of the edge, the frequency of "casting off" being approximately V/10 r. Figure 9 (d) shows the effect of "fining" the trailing edge of the blade. It is seen that the vortex spacing λ becomes smaller and consequently the "casting off" frequency becomes larger. The larger frequency combined with a smaller vortex strength is conducive to a "quiet" propeller.

Cavitation

When the water velocity becomes so high that the dynamic pressure in the water is reduced to the vapor pressure of the water, cavitation results. The vapor pressure of water, for these purposes, may be taken as absolute zero without sensible error. Bubbles are then formed, and when they collapse on or near the surface of propellers and struts, very large hydrodynamic pressures are created. The destructive action of cavitation is well known and will not be discussed here, but the cavitation phenomenon, especially in its incipient stages may cause vibration of the propeller blades and consequent noises.

Figure 10 (a) shows the velocity distribution around a blade section of segmental shape. If the back or curved outline of the section has bumps, as shown at Fig. 10 (b), the velocity near these bumps will increase and consequent cavitation will set in. The noise emitted by the cavitation acting on the propellers is sometimes diagnosed as singing. It is usually of rather high frequency, bordering on the region of supersonics.

The cavitation bubbles collapsing on the surface of the propeller blades will make the blades resound, but the bubbles collapsing in the water itself, and incidentally vibrating in several radial modes before their collapse, will emit noise of frequencies depending on the size of the bubble as well as on its modes of vibration. Fig. 10, (c), (d), and (e) show the three lowest mode radial vibrations of the bubbles with their theoretical frequencies for various bubble sizes. The high pitched swish, characteristic of cavitation, is due to the vibration of such bubbles.

Bearing or Gland Excited Vibration

A strong torsional vibration of audible frequencies is sometimes observed in the propeller shaft. Its origin lies in the dry or semi-dry friction of the stern tube bearings or packing gland or in the strut bearing. It is akin to a chatter and is of the self-excited type. It usually appears when the shaft is slowing down toward a stop. An explanation of its mechanism follows:

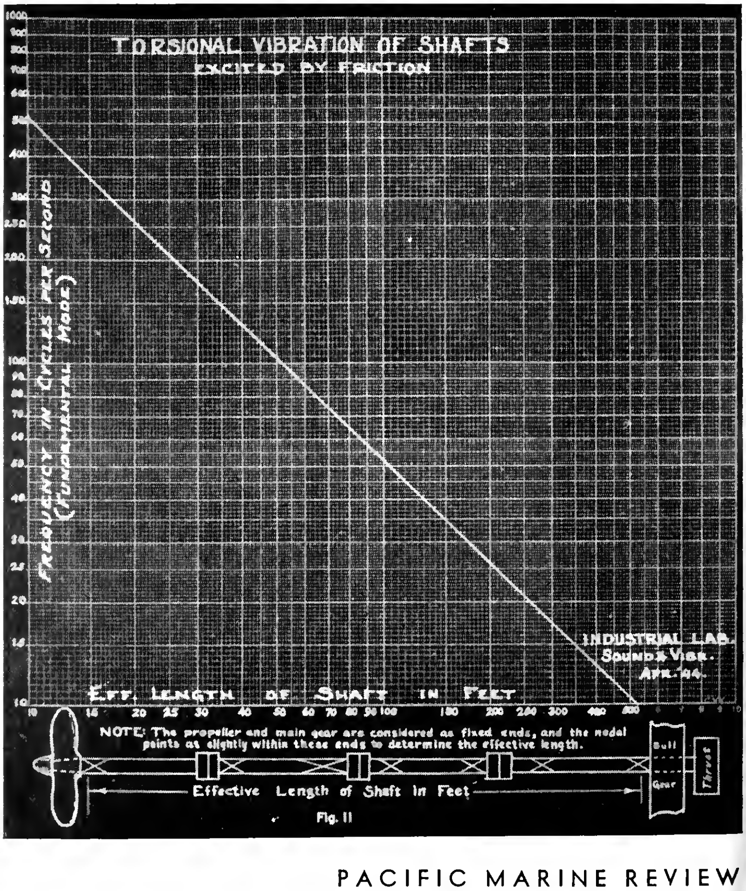
The moments of inertia of the propeller and the bull gear are very large compared to the moment of inertia of the shaft itself. Consequently, the shaft may be considered torsionally clamped between the two large moments of inertia. The torsional, natural frequencies of the "clamped" shaft depend only on the length of the shaft and are integer multiples of the fundamental torsional frequency, given by Fig. 11. The system is torsionally the equivalent of the vibrating string discussed at the beginning of this paper. Any rubbing friction on the shaft of a bearing or a gland can excite one or more of the torsional modes just as a violin bow can excite a violin string in a lateral mode. Energy from the rotating shaft will be transferred into the torsional vibratory motion of the shaft because the magnitude of the coefficient of friction depends on the relative velocity of the shaft and the rubbing agent. Thus, when the velocity of torsional vibration is with the velocity of rotation, the relative velocity is less than when the velocity of torsional vibration is against the velocity of rotation. For a smaller relative velocity the coefficient of friction is higher than for a larger relative velocity. Consequently, the frictional force for vibration with the direction of rotation exceeds the frictional force for vibration against the direction of rotation, the net result being that the vibration will increase until internal damping of the system limits it to a finite value. Increased lubrication and/or changes in clearances will usually remedy the situation.

Effect of a Crooked Shaft

When a crooked shaft or non-concentric shaft section is present, the effect is ordinarily one transverse impulse per revolution. This is often mistaken for mass unbalance, but it

(Continued on page 120)

Fig. 11



A New Santa Monica Forge Plant

James Sheehan, president of Arcturus Manufacturing Corporation.

"Hitch your wagon to a star

Hang on tight and there you are."

Perhaps James Sheehan, president of the Arcturus Manufacturing Corporation of Santa Monica, California, had this old rhyme in mind when he named his firm. For not only did he hitch it to a star but he chose "a giant fixed star of first magnitude whose name means 'stand guard.' At any rate it has worked in his case. He, however, not only "hung on" but also put an apparently inexhaustible fund of energy and good common sense into building up his firm's reputation for promptness and efficiency of forgings, finished to the most exacting tolerances.

This reputation has brought such a volume of work that the firm decided to expand into a new and greatly enlarged plant. For this expansion they secured a five acre site in Santa Monica and erected thereon a plant designed by their own efficient forge executives. The buildings for the new shops are of modern construction with ample provision of fenestration, ventilation and heating. Electric pneumatic and hydraulic energy is available at numerous outlets The opening of this plant was recently announced by President Sheehan.

The new shops are equipped to produce efficiently and in quantity small and large forgings of iron, steel, stainless steel, brass, bronze or monel The large machine shop is tooled especially for finishing rough forgings to the most exacting specifications

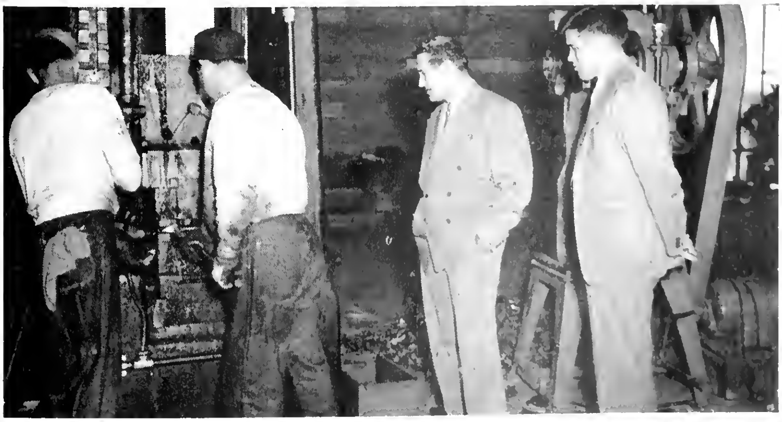
Special heat treating furnaces and tempering vats that operate under exact control are installed in the forge shops and in the die shop In short the equipment includes every item necessary for the production of high grade forgings by efficient and experienced forgers.

These new facilities have enabled Arcturus to handle many additional forge contracts and are aiding greatly in minimizing the difficulty of obtaining forgings a problem that has long worried the war production contractors of the Pacific Coast

Arcturus has a "raw metal to finished part" service that can greatly reduce the difficulties of maintaining production schedules

The design and making of forging dies is a specialty and the technical staff of this firm is available for advice on all special forging problems

R. A. Stumm, Jr. (right), Steel Forging Purchasing Agent for Douglas Aircraft Company, and J. B. Thorpe (second from right), sales manager for Arcturus Manufacturing Corporation, watch a forging being made at the new Arcturus Forge Plant.



Ship Vibration Problems

(Continued from page 118)

is unlike it in regard to its independence of shaft angular velocity.

Effect of Bearing Misalignment

The primary effect is increased static bearing load with possible over heating. Purely elastic distortion of a uniformly rigid shaft due to bearing misalignment should not cause vibratory forces. However, if the shaft has large keyways or other non-uniformities so that its bending rigidity depends on its angular location, vibratory forces twice per revolution will result from bearing misalignment.

Other Causes of Vibration

In reciprocating engines periodic forces and moments of various orders are usually present. A discussion of these will not be attempted in this paper. The vibration of turbines, generators, motors, and gears will also be omitted as they are not peculiar to ships. It is understood that companion papers on the above vibration causes have been prepared.

Psychological Effects

As a closing paragraph a few words should be said about the psychological effect of vibration and noise. Experience with many ships, mainly of the combatant type, leads the author to the conclusion that vibration sensitivity as well as vibration callousness is imparted to the whole Ship's Company as a unit. Just how such sensitivity or callousness originates might be an interesting psychological study and would undoubtedly result in assigning quantitative values to the Captain's opinion, the Chief Engineer's opinion, etc. The only obvious observation that the author can record is that "landlubber" power plant engineers are usually oversensitive to vibration and so are marine engineers who have had long service on slow speed vessels, while people with PT boat and Destroyer backgrounds are often overcallous to vibration. The fact remains that of several sister ships, with identical, instrumentally recorded vibrations, we still find some that are "bad vibrators" in the opinion of their Ship's Company, while others give satisfactory performance.

Ship Repair Plays Big Role in Atlantic War

(Continued from page 101)

danger of fire or explosion when burners and welders take over.

Burners are like surgeons, cutting away infected bone and flesh as the first essential in an operation. When shell plates have to be removed, burners skilled in the craft of "blowing" rivets take out rivets without damaging the plates or the framework behind them. One damaged ship required nearly 100,000 rivets to be blown. Burners also work with the fitters throughout the job, cutting and beveling plates, and "knocking off" excess material.

Nearly every trade is represented in ship repair, and the work that goes on aboard a drydocked ship is only a part of the operations in a ship repair plant. Complete manufacturing processes are housed in various yard buildings, and almost everything that is turned out is a custom job—because no two repair or conversion jobs are alike. The plate shop turns out tailor-made sections and plates, and fabricates housings and gunmounts. In the forge shop heavy parts, such as casings, girders, beams, chains and propeller parts are made or repaired. Then there are the pipe shop, riggers' loft, mold loft, carpenters' shop, paint shop, and numerous supplementary sheds and buildings.

When a vessel comes into a ship repair yard, whatever is needed, from a whole new bottom to a galley exhaust pipe, is made on the spot, except for certain special equipment.

In the construction of new ships since Pearl Harbor, American builders have made an amazing record—and one to which Todd Shipyards Corporation has contributed notably in its five construction yards with a total of 63 building ways.

But new building alone would not have been adequate to maintain the supply lines to our overseas bases and to our Allies. And so Todd takes pride in the speed and efficiency of its thousands of ship repair craftsmen—which from Pearl Harbor to the end of July, 1944, sent from Todd yards more than 70,000,000 tons of repaired or converted shipping into the sea lanes that lead to victory.

BOOK REVIEW

The Oxy-Acetylene Handbook

A 600-page manual fully illustrated with diagrams, drawings and halftones, neatly bound. Published by The Linde Air Products Company, New York, N. Y. Price $1.50 net.

A valuable textbook and ready guide and authoritative reference for plant management executives, engineers, designers, superintendents and foremen in shops where oxy-acetylene welding and cutting is used or might be used as either a production or a maintenance tool.

This is a how-to-do-it book. A few of the many subjects covered are:

How to set up, operate, and care for oxy-acetylene apparatus.

What flame adjustment to use and how to use it.

How to identify metals.

How to weld steel, cast iron, malleable iron, galvanized iron.

How to weld aluminum, copper, brass, bronze, nickel, monel, lead, magnesium.

How to bronze-weld.

How to do heating, bronze-surfacing, hard-facing, flame-hardening, silver-brazing.

How to cut steel, cast iron, stainless steel.

How to test welds.

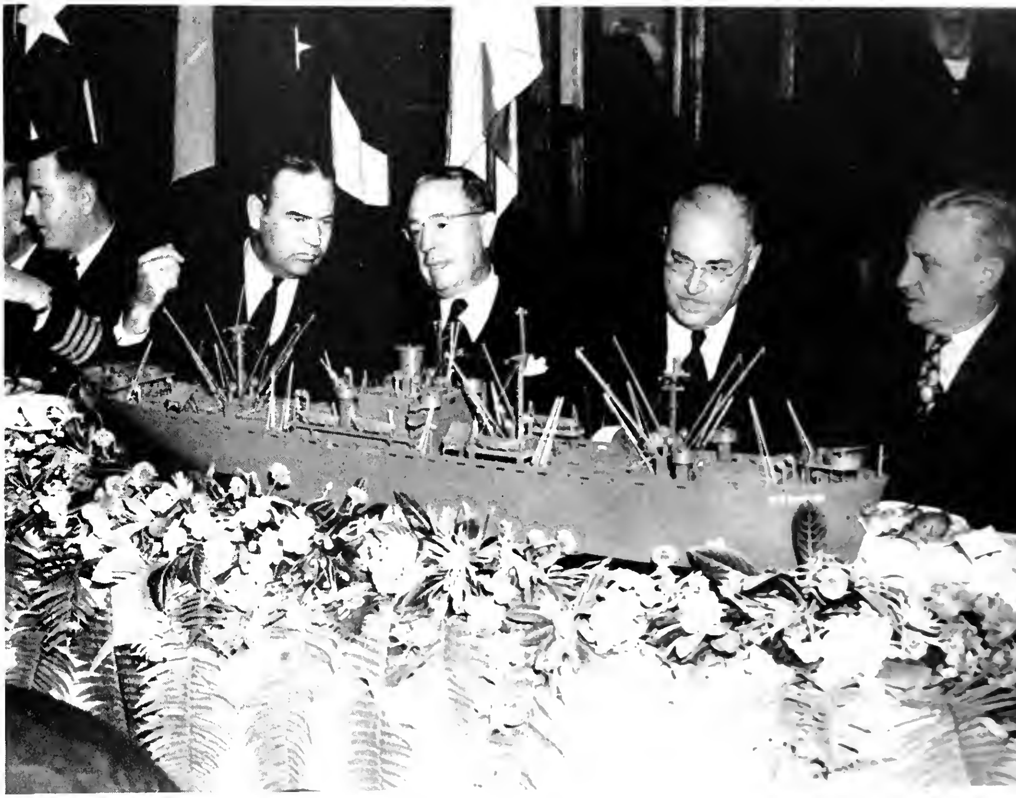
How to develop welding procedure controls.

How to organize and lay out a welding shop.

Running LIGHTS

WHO
WHEN
WHERE

Edited by B. H. Boynton



Guest table at the United States Maritime Service Center in San Francisco where the joint luncheon of the San Francisco Propeller Club, the Pacific American Steamship Assn. and the Ship Owners Assn. of the Pacific Coast, was held.

Left to right: Captain H. J. Tiedemann, USMS, Pacific District Operations Officer; Captain H. H. Dreany, USMS, assistant commandant; Hugh Gallagher, general chairman for San Francisco's Victory Fleet Day; U. S. Maritime Commissioner John Carmody; and Frazer Bailey of Matson Navigation Co.

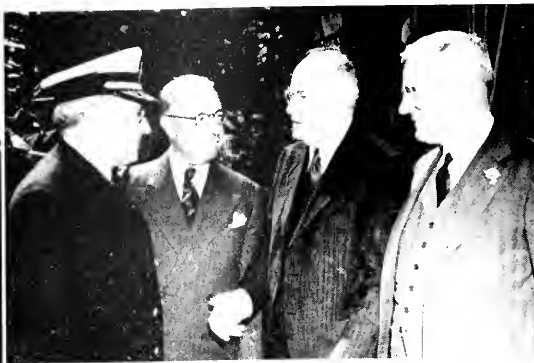
Victory Fleet Day, 1944

IN SAN FRANCISCO AND LOS ANGELES

Victory Fleet Day! Why is this day, the 27th of September, celebrated? It marks the anniversary of the launching of the **first** Liberty ship, the Patrick Henry, in 1941.

This year, the day was dedicated by Admiral Emory S. Land to the wartime management and operating accomplishments of the private American steamship companies. On the next two pages are scenes of the celebration, both in San Francisco and in Los Angeles.

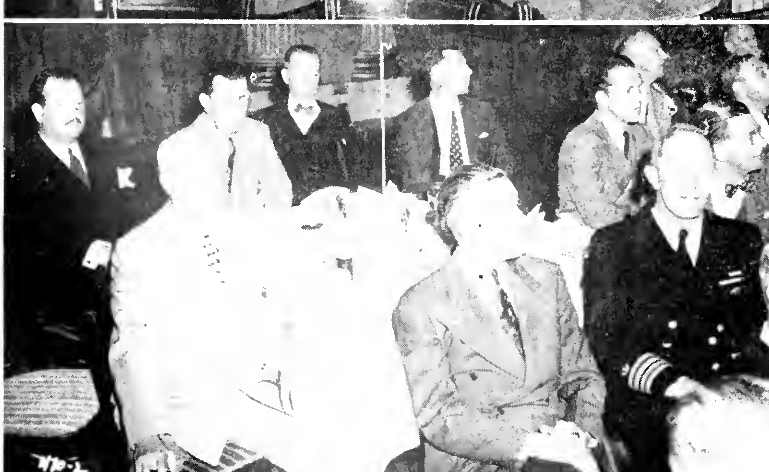
The Propeller Club, Port of San Francisco, the Pacific American



Center, left to right: Rear Admiral D. D. Jones, Coordinator for the Port of San Francisco, U.S.C.G.; Hugh Gallagher; Commissioner John M. Cormody, from Washington, D. C., speaker; and Fred Doelker, president, Port of San Francisco, Propeller Club.
Left: Captain H. J. Tiedemann delivering speech during radio broadcast following the luncheon.
Right: Captain H. H. Dreany, also "on the air."

Steamship Association and the Ship Owners Association of the Pacific Coast observed this day at a joint luncheon at the United States Maritime Service Center, 1000 Geary Street.

In Southern California, the Los Angeles-Long Beach Propellers held their joint luncheon with the General Agents for War Shipping Administration at the Biltmore Hotel.



Below: John Cormody, U. S. Maritime Commissioner from Washington, D. C., speaker of the day, in San Francisco.

IN LOS ANGELES

Upper left: These men displaying the WSA pennant awarded the 16 steamship operators of Los Angeles are: (L to to r): Stafford Harlow, WSA; Chas. A. Dostal, Lee Vermille, E. A. MacMahon, pres., Los Angeles Steamship Assn. and dist. mgr., Luckenbach Steamship Co.

At left: Seated around the table are: L. E. Archer, mgr., Los Angeles office, Moore-McCormack Lines, Inc.; Chas. Tilley, Outer Harbor Dock & Wharf Co.; W. A. St. Amant, Grace Line; James A. Keller, Pacific Coast Cement Institute; Antonio Dutriz, and D. Cutler, Grace Line; W. J. Marsh, Captain J. Otteson and E. M. Salter, Moore-McCormack.

IN LOS ANGELES

In recognition of meritorious war service by American flag ship operators under the direction of WSA, a specially designed pennant and certificate were presented to the Pacific Coast shipping companies during the ceremony in front of the San Francisco City Hall, and during the luncheon ceremonies at the Biltmore in Los Angeles.

The pennant consists of two horizontal bars of red separated by a white bar with a large blue circle with the letters "WSA" in white imposed over the red and white bars at the staff end of the pennant. Blue stars will be added to the pennant to indicate the number of ships operated by the agent; one star, 5-25; two stars, 26-50; three stars, 51-75, and four stars, 76-100 vessels.

The following companies were recipients of this honored recognition in San Francisco: Alaska Packers Assn.; American-Hawaiian S. S. Co.; American President Lines; W. R. Chamberlin & Co.; General S. S. Co.; Grace Line; Hammond Shipping Co.; Luckenbach S. S. Co.; Matson Navigation Co.; O. J. Olson S. S. Co.; Pope & Talbot - McCormick S. S. Co.; Moore-McCormack Lines; Norton, Lilly Management Corp.; De La Rama S. S Co., Inc.; Shepard S. S. Co.; Isthmian S. S. Line; Sudden & Christenson; United Fruit Co.; U. S. Lines-Coastwise Lines; Weyerhaeuser Line; Interocean S. S. Corp.; Burns S. S. Co.· Pacific Tankers, Inc.; Standard Oil Co. of California; Northland Transportation Co.; Alaska Steamship Co ; James Griffiths & Sons; Alaska Transportation Co.; Olympic Steamship Co.; American Mail Lines; and Tide Water Associated Oil Co.

In Los Angeles awards were presented to the following: General S. S. Corp., Ltd.· Sudden & Christenson; Pope & Talbot-McCormick Steamship Co.; Luckenbach Steamship Co.; Isthmian Steamship Co.; Moore - McCormack Lines; Matson Navigation Co.; Burns Steamship Company; American President Lines; United Fruit Co.; American Hawaiian Steamship Co.; De La Rama Steamship Co., Inc.; Interocean Steamship Corp.· American West African Lines; Grace Lines, Inc.; and Norton Lilly Management Corp.

Above: Admiral Albert Ware Marshall (USN retired) proposes a toast "To our country, right or wrong, our country."

Extreme left, Westinghouse Electric & Mfg. Company's vice president (in San Francisco) Chares A. Dostal, who was the principal speaker; Lee K. Vermille, president, Propeller Club, Overton, Lyman & Plumb; Stafford Harlow, War Shipping Administration; Rear Admiral I. C. Johnson, USN (Retired), Director of Naval Procurement, 11th Naval District.

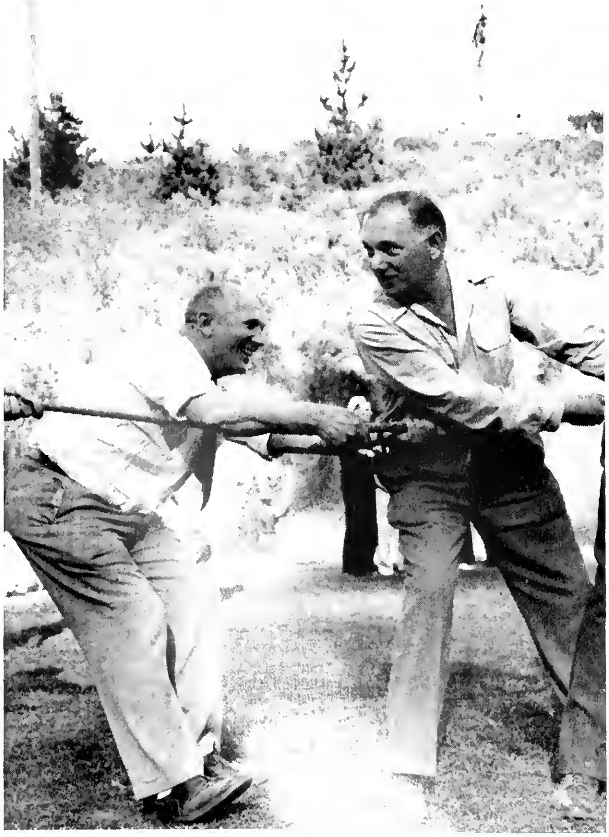
Right: Stafford S. Harlow, WSA, assistant director, presents pennants to Edgar F. Wilson of American President Lines and to F. A. Hooper of American-Hawaiian S. S. Co.

Below: left to right: W. C. Fulton, Isthmian S. S. Co.; Carl Martin, Wilmington Transportation Co.; Joe M. Costello, J. M. Costello Supply Co.; P. V. Gaudin, super. engineer, L. A. Tankers; R. H. Hannah, operations manager, General Steamship Corp.; Erle B. Smith, Rubber Products Co.; Dave Steward, Pacific Marine Surveys; and Ray Sullivan, Hagan Corporation.

"ROBBERY, HE'S SAFE!"

On the side lines are Mrs. Jerry Fowble, Jim Bouick, Mitchell Breingam, Mrs. Polly, and Ken Polly. Seated on the ground are: Jerry Fowble, H. Morgan, Mrs. Morgan, Mrs. Reed, Bill Reed.

"At bat" and "over the home plate" is Mike Ryan, with T. Ryan as catcher.



Little Miss Maria Elenia Piraiane caught the spirit of the picnic. She's not missing a thing.

Sam Gazzano, public relations at Joslyn and Ryan with a prize bottle of Four Roses which was won by a lucky engineer.

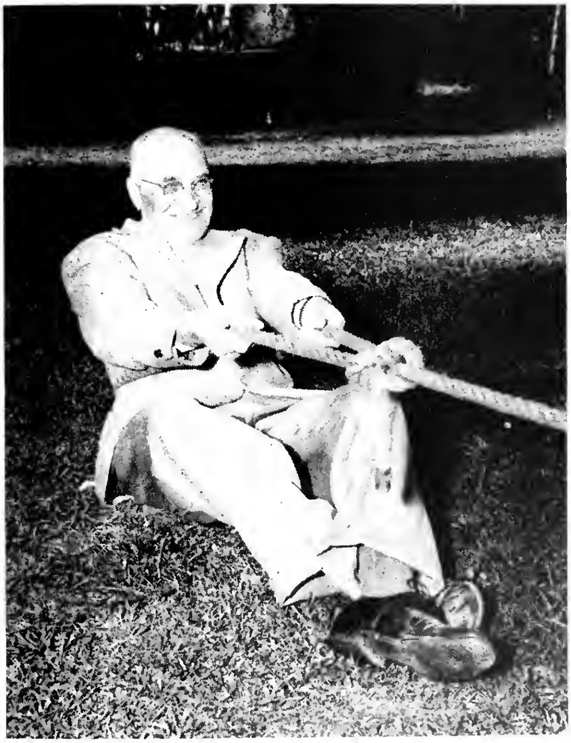
Marianne Quon and Nellie Tom, entries in the Women's three-legged race.

At left: Two strong-armed men in the Men's tug-of-war are Tom O'Brien and one of the engineers.

Joslyn and Ryan's Annual Picnic

AT LAKE TEMESCAL, OAKLAND CALIFORNIA

Scenes of fun and folic at the J. & R. picnic, games, including the tug-of-war and mixed thee-legged races, football throwing, swimming, baseball with delectable noon-day spread. Door prizes and game prizes were lavish and useful. Several hundred people, guests and employees of Joslyn and Ryan were in attendance, all having a wonderful time, Sunday, October 1st, at Lake Temescal, Oakland, California.

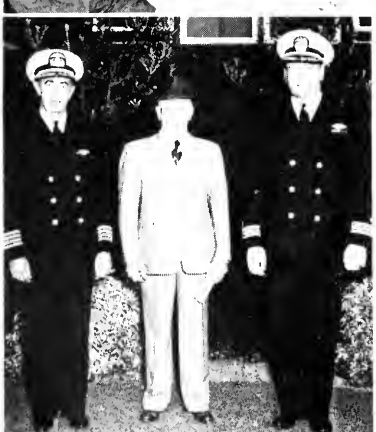


Paul Joslyn holding down his end in the Men's tug-of-war.

Over the line in the mixed three-legged race are Byrdene Calkins and Thornton Craig, who won $5.00 each, donated by Hooper Pattern Works.

In the center, above: Mr. & Mrs. Paul Joslyn and Mr. & Mrs. Mike Ryan.

The Class of 1952, up the line of scrimmage.



Carroll Reeves of De Laval Steam Turbine Co.

PROPELLERS AT USMS OFFICERS SCHOOL IN ALAMEDA

Top left: Lt. Comdr. F. C. Krastin, USMS, Exec. Officer of station, explaining to W. W. Taylor and Edmund C. Hill some of the techniques of engineer officer training.

Second from top left: Group of the Port of San Francisco members at luncheon on October 11, guests of Captain M. E. Crossman, Superintendent, as they inspected the station which trains officers for the merchant service.

At left: Rear Admiral J. A. Alger, USCG (R) with Captain M. E. Crossman, USMS (left) Superintendent of the station, and Commander W. E. Porter, USMS, former Exec. Officer of station.

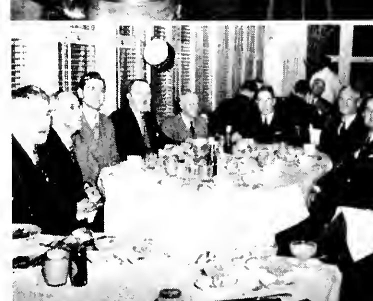
Lower left: Lt. Grady Rudder, USMS, tells of night vision training course. Goggles are to accustom eyes to darkness.

Top right: Fred Doelker (right), president of Propeller Club and Rear Admiral James A. Alger, USCG (R), inspecting the galley.

Second from top right: Another group at luncheon.

At right: Club visitors in wheel house of School's Seamanship Bldg. At the wheel is Dave Currier of the Maritime Commission, while aiding in "navigation" are Joseph A. Lunny, A. J. Nolan, and Bern De Rochie.

Lower right: Another portion of the Propeller Club at lunch.



Charles R. Page

Charles R. Page Appointment

Henry F. Grady, president of the American President Lines, announced the election of Charles R. Page, prominent San Francisco business executive, to fill a vacancy on the Board of Directors of the American President Lines.

A San Franciscan by birth, Mr. Page is the son of an admiralty attorney and a member of a family identified with Pacific Coast shipping affairs for two generations. After graduation from Yale University, Mr. Page joined the Fireman's Fund Insurance Company in its Marine Department in 1902. Since that time he has, with the exception of a period of service with the United States Government, been continuously identified with that company, becoming its president in 1937 and the Chairman of the Board in 1943.

During World War I he served as commissioner of the United States Shipping Board and trustee of the United States Shipping Board Emergency Fleet Corporation.

Mr. Page has always been active in civic and community affairs. He has served as a director of the San Francisco Chamber of Commerce and of the War Chest and was active in the development of plans for Civilian Defense for the Pacific Coast. Currently he is president of the San Francisco Fire Commission.

Brooks Equipment Co. Moves in Portland

Charles Neal, general manager of the Brooks Equipment Company, recently returned from Portland where he supervised the moving of the company's offices from the Board of Trade Building to the Rude Wilhelm Warehouse Company at 1233 NW. 12th Avenue.

The move was necessitated by the company's rapidly increasing business in the Portland territory and by the addition of such lines as the Ladish Drop Forge Company and the Howard Supply Company, for which the Brooks Company has been appointed Washington - Oregon sales representatives and distributors. Another line recently added by the company is the Vapor Recovery Systems Company and Marine Service Company.

The Brooks Equipment Company, according to Mr. Neal, are now able to give overnight truck service to all points in the Northwest, including Seattle and the Puget Sound area.

The Seattle headquarters of the company have also been remodeled during the past month to provide more space for stocks carried by the company, Mr. Neal stated.

Top, right: New offices of the Brooks Equipment Company in the Rude Wilhelm Warehouse Company at Portland. General Manager Neal on the phone.

At right: The new stock rooms in Portland which will provide fast delivery of parts to shipyards and industrials in the Northwest.

Julean Arnold, former Commercial Attache to the American Embassy in China.

Julean Arnold Discusses China At Women's Organization Meet

"Too much time is spent talking about taking Japan and so little is being done for China. There is inexplicable apathy and indifference on the Pacific Coast toward China and the Far East." So stated Julean Arnold during his talk before the Women's Organization for the American Merchant Marine at the Army-Navy Club in San Francisco on October 10, the 33rd anniversary of the founding of the Chinese Republic.

Julean Arnold knows his subject as he spent 38 years in China as Commercial Attache to the American Embassy. On this subject of the Pacific Coast's lack of interest in the Far East, he recalls that there was never a Pacific Coast newspaper resident correspondent out there. Eastern papers such as the New York Times had two representatives, but upon inquiring why there were no Pacific Coast representatives, he always received the same reply, "PUBLIC NOT INTERESTED."

To further illustrate this point Mr. Arnold quoted from Fortune, August, 1942 issue:

> "America is rapidly waking up to a true awareness of Asia. We note with special satisfaction that the West Coast is beginning to see the vision of the future of the Pacific Area. It would be a happy omen if at least one outstanding West Coast citizen were given a place of first magnitude in our war effort. And let him be, of course, a citizen who has caught the vision of the ocean he lives on."

Mr. Arnold stressed the fact that Jap-instigated anti-American propaganda must be broken down in order to FREE China, and that this is the only prospect for a peaceful and prosperous Pacific in the years to come. He said that it is essential that we build up a strong and permanent trans-Pacific American mercantile marine to ward off a repeat of the last war, when Japan stepped in and handled American cargo on Japanese ships.

"An esprit de corps must be built up among seamen and other personnel aboard American ships equal to, if not greater than that of other countries. Government subsidies are positively necessary to guarantee continued use of our merchant marine in overseas trade."

He offered several concrete suggestions for action by the Women's group such as: outline program of education for the revision of geographies and textbooks towards factual information regarding China; cultivate friendship of Chinese living in our communities; sponsor a mapparium for Golden Gate park; strive to make San Francisco Bay area trans-Pacific-merchant-fleet minded; and stimulate the Pacific Coast to assert national leadership in Pacific affairs.

Los Angeles Manufacturer Supplies Phosphor Welding Rods Nationally

In 1935 Chris Eccles, president of Eccles & Davies Machinery Co., Inc., first became interested in the manufacture of a phosphor bronze electric welding rod. Although it was his firm belief that the Pacific Coast would take its rightful place in industry, little did he anticipate the production records and deliveries that would be achieved throughout the ensuing years. Peak deliveries, for example, were attained during the previous month—one shipment alone constituting an entire carload.

The electrode was placed on the market under the trade name of EDCO, and especially designed with a heavy yellow coating, so that under normal welding conditions, the heat input of the deposit is sufficient to pre-heat the base metal to such a degree that the deposition of flat well fused beads on layers can be accomplished in subsequent beads or deposits. This factor, which alone proved a large saving in time and money, plus the ductility of EDCO welds on cast iron, was soon recognized by the industry.

One of its original uses was to weld combined brass, iron and sheet iron in a transformer for a Los Angeles Public Utility, and from there broadened to other industries. Some particularly fine jobs with EDCO are —welds on a combination of brass, copper, everdur and steel; welding on cast iron cylinders and steam locomotive cylinders without dismantling.

Cases of phosphor bronze electrode ready for shipment.

Continuous Supplies...

CALL FOR MOUNTING DOLLARS

Official U. S. Coast Guard photo

Official U. S. Marine Corps photo

....STEP UP YOUR PAY ROLL PLAN!

War is a continuous job.

Ever-widening, ever-advancing fighting fronts call for a never-ending flow of manpower and materiel—*financed by a continuous flow of money.*

Your responsibility as top management increases with the mounting tide of battle. You've been entrusted with two major responsibilities—steadily maintained production, and steadily maintained War Bond Sales through your Pay Roll Savings Plan.

So keep this one salient fact before you at all times: *The backbone of our vital war financing operation is your Pay Roll Savings Plan.*

Your job is to keep it constantly revitalized. See to it that not a single new or old employee is left unchecked. See to it that your Team Captains solicit everyone for regular week-in and week-out subscriptions. And raise all percentage figures wherever possible.

Don't underestimate the importance of this task. This marginal group represents a potential total sales increase of 25% to 30% on all Pay Roll Plans.

Constant vigilance, in a quiet way, is necessary to keep your Pay Roll Savings at an all-time high. Don't ease up—*until the War is won!*

The Treasury Department acknowledges with appreciation the publication of this message by:

MATSON
NAVIGATION
COMPANY

SELL WAR BONDS

Back the Attack!
SELL MORE THAN BEFORE!

This is an official U. S. Tr... ...t prepared under the auspices of Treasury Department and War Advertising Council

Thompson on Job 30 Years

When the shipping fraternity learned that **Harry Thompson,** on October 11, had served thirty years continuously, with the exception of his two years' service in World War I, for W. R. Grace & Co. and the Grace Line, it was rather hard to believe, because the popular freight traffic manager looks about this age.

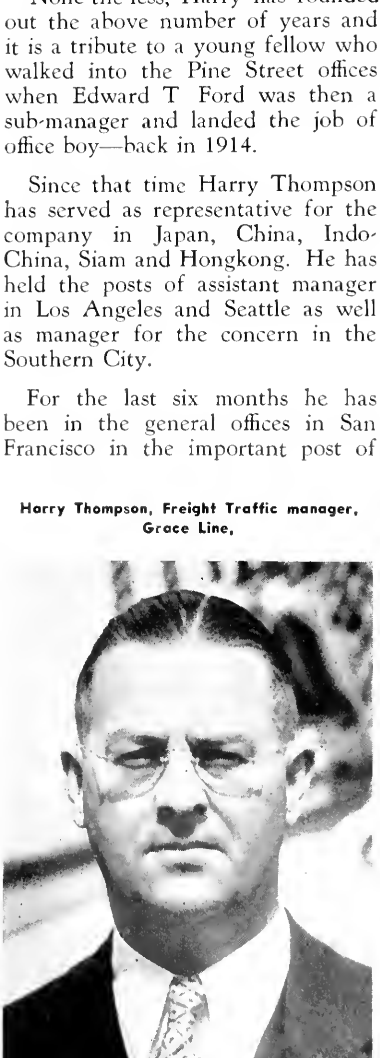
None-the-less, Harry has rounded out the above number of years and it is a tribute to a young fellow who walked into the Pine Street offices when Edward T Ford was then a sub-manager and landed the job of office boy—back in 1914.

Since that time Harry Thompson has served as representative for the company in Japan, China, Indo-China, Siam and Hongkong. He has held the posts of assistant manager in Los Angeles and Seattle as well as manager for the concern in the Southern City.

For the last six months he has been in the general offices in San Francisco in the important post of freight traffic manager, handling the greatest volume of Pacific Ocean war traffic in the company's history.

Harry Thompson is one of the best known and popular of the younger executives in the maritime industry.

Harry Thompson, Freight Traffic manager, Grace Line,



Clifford Bergland Joins Carswell Marine

Clifford O. Bergland came out to the Pacific Coast staff of Carswell Marine Associates, Inc., in August, having previously been employed by the Transportation Corps in Cincinnati. Prior to this, he served as an inspecting engineer with the Panama Canal and the Engineer Corps in Washington, D. C.

He received his degree in Electrical Engineering from Montana State College in 1934 and after graduation spent six years in the construction field as an engineer on a hydraulic dredge.

He will work with E. H. Biddison up and down the coast, with home office in San Francisco.

Carswell Marine Associates, Inc., is the Marine Department of: The Landley Company, Inc.; Gifford-Wood Company; Colvin - Slocum Boats, Inc.; Lake Shore Engineering Company; Ulster Foundry Corporation; Catskill Metal Works; American Ventilating Hose Company. They have recently become the West Coast office of the Lombard Governor Corporation of Ashland, Mass.; and also the San Francisco office for the Cargocaire Engineering Corporation.

J. S. Carswell represents the Marine Department of McKiernan-Terry Corporation in the United States, and the Colby Steel and Engineering Company in all states except the Pacific Northwest.

Timken Metallurgist

A. F. Sprankle has been appointed metallurgical engineer in The Timken Steel and Tube Division, according to a recent announcement by Th
Timken Roller Bearing Co of Car
ton, Ohio. He was formerly manage
of the Alloy Bureau of Carnegi
Illinois Steel Corp. in the Pittsburg
District.

STATEMENT OF OWNERSHIP

**STATEMENT OF THE OWNERSHIP, MAN
AGEMENT, CIRCULATION, ETC., R
QUIRED BY THE ACTS OF CONGRESS C
AUGUST 24, 1912, AND MARCH 3, 1933**
Of PACIFIC MARINE REVIEW, publishe
monthly at San Francisco, California, for Octob
1, 1944, State of California, County of San Fra
cisco.

Before me, a notary in and for the State ar
county aforesaid, personally appeared BERNAR
N. DeROCHIE, who, having been duly sworn a
cording to law, deposes and says that he is the Bu
ness Manager of the PACIFIC MARINE REVIE
and that the following is, to the best of his know
edge and belief, a true statement of the ownershi
management, etc., of the aforesaid publication f
the date shown in the above caption, required
the Act of August 24, 1912, as amended by the A
of March 3, 1933, embodied in section 537, Pos
Laws and Regulations, printed on the reverse of th
form, to wit:

1. That the names and addresses of the publish
editor, managing editor, and business managers ar

Publisher, JAMES S. HINES, 500 Sansome S
San Francisco.
Editor, ALEX J. DICKIE, 500 Sansome Stre
San Francisco.
Managing Editor, None.
Business Manager, Bernard N. De Rochie, 5
Sansome St., San Francisco.

2. That the owner is: (If owned by a corporatic
its name and address must be stated and also imn
diately thereunder the names and addresses of sto
holders owning or holding one per cent or more
total amount of stock. If not owned by a corpo
tion, the names and addresses of the individ
owners must be given. If owned by a firm, compa
or other unincorporated concern, its name and
dress, as well as those of each individual memb
must be given.)

JAMES S. HINES, Owner.

3. That the known bondholders, mortgagees, a
other security holders owning or holding 1 per c
or more of total amount of bonds, mortgages,
other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giv
the names of the owners, stockholders, and secu
holders, if any, contain not only the list of sto
holders and security holders as they appear upon
books of the company but also, in cases where
stockholder or security holder appears upon
books of the company as trustee or in any other
duciary relation, the name of the person or corpo
tion for whom such trustee is acting, is given;
that the said two paragraphs contain statements
bracing affiant's full knowledge and belief as to
circumstances and conditions under which st
holders and security holders who do not app
upon the books of the company as trustees, h
stock and securities in a capacity other than that
a bona fide owner; and this affiant has no reason
believe that any other person, association, or
poration has any interest direct or indirect in
said stock, bonds, or other securities than as
stated by him.

B. N. DeROCHIE,
Business Manager

Sworn to and subscribed before me this 29th
of September, 1944.

EDITH GOEWEY,
(SEAL) Notary Public in and for the
and County of San Francisco, S
of California.
(My commission expires December 23, 1944.)

Meet John F. Gehan, vice president of American Export Lines, recently elected president of the Port of New York of the Propeller Club of the United States for 1944-1945.

Gehan Honored

John F. Gehan, vice president of American Export Lines, president of the Propeller Club of the Port of New York, and president of the New York Shipping Association, has been given new honors—election to the executive committee of the United Seamen's Service.

Mr. Gehan is a director of the American Merchant Marine Institute, the Maritime Exchange of New York, the American Steamship Owners' Protective and Indemnity Association and a member of the Society of Naval Architects.

He began his shipping career in 1920, and has been with the American Export Lines since 1925.

Another Award For Matson

The Matson Navigation Company has again been recognized for the splendid work by its Construction and Repair Department. The Navy Department has renewed Matson's Army-Navy "E" Award, and one star will be affixed to the Matson "E" Flag. It was difficult to win the Army-Navy "E," and by meriting a renewal, the management and employees have indicated their determination and ability to support our fighting forces by supplying the equipment for ultimate victory.

W.S.A. Promotions

In the intensification of military progress against Germany and Japan, the War Shipping Administration, as a prominent unit in the supply activities of the armed forces, announced reassignment of supervisory personnel in all war theaters.

In the shift three well-known San Francisco trained steamship leaders were named, two being elevated to higher posts, while **Charles E. Brown,** on loan from Matson Navigation Company, continues as regional director for the Australia-New Zealand area with headquarters in Sydney.

Ernest J. Bradley, another former Matson executive, who, before the invasion, was assistant Pacific Coast director of the W.S.A., and who, when France was entered by the Allies, played a major part in directing the convoys, has been named assistant to Thomas Monroe. The latter is director for the United Kingdom Northwest Continent area, with headquarters in London. Mr. Bradley holds the title of regional director for the United Kingdom.

In the Pacific **Herbert L. Schage** has been named regional director for the Southwest Pacific Forward Area with headquarters in Hollandia, New Guinea.

De Pue With United Engineering Co.

Robert E. Christy, president of the United Engineering Corporation of San Francisco, announced the recent appointment of **Frank H. De Pue**, as chief estimator of the firm.

Mr. De Pue brings to the company a wealth of experience in the field of marine engineering, ship survey and repairs. He recently resigned from the firm of Hough and Egbert, consulting engineers and marine surveyors, and previous to this was for 25 years with the Moore Dry Dock Co., as sales manager, specializing in repair and conversion work.

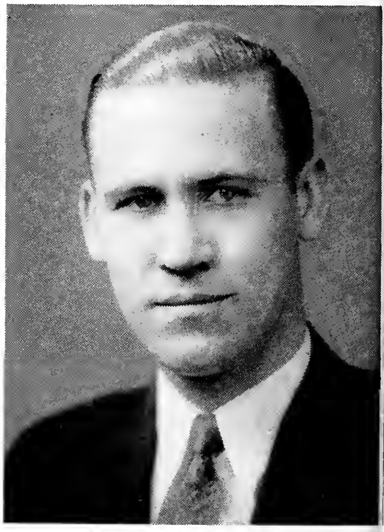
Frank is well known as the popular president of the Mariner's Club of California. His many friends throughout the industry wish him success in this new assignment.

Steamship Night at Pacific Traffic Association

The twenty-fifth annual Steamship Night party and dinner of the Pacific Traffic Association was held in the Gold Ballroom and Concert Room of the Palace Hotel, San Francisco, October 12th. Some 300 members and guests enjoyed as fine a party as the Association has ever put on; suggestive of pre-war Steamship affairs. House flags of twenty-nine steamship companies were used as decorations and a Victory Fleet Day flag was also displayed.

Able chairman of the committee arranging the affair was Ted Luedke of the McCormick S. S. Co. Assisting him were Ray Burley of McCormick S. S. Co., Bob Pyke of Grace Lines, Charles Reali of General S. S. Co., Gene Hurst of Matson Navigation Co., Frank Cook of United Fruit, and "Dutch" Pierson of De La Rama S. S. Co.

Ted Luedtke, McCormick Steamship Co.



Sweden Plans to Resume Pacific Coast Shipping

The Johnson Line, pre-war operators of the largest and most modern fleet of motorships between Pacific Coast ports and Sweden, declares that Sweden will be the first European nation to resume steamship service between Pacific Coast ports and Europe at the close of the war. The announcement, made by W. R. Grace and Co., general agents, said that the Johnson Line will resume operations within a short time after hostilities cease and government regulations permit.

While Sweden is reported to have lost a large number of fine motorships in the war, her shipyards have replaced a large portion of this tonnage. Recently the Johnson Line launched the Suecia, which is rated by Lloyd's as "100-A," meaning that the combined luxurious passenger accommodations and modern propulsion and cargo handling equipment are as fine as on any ship of her type afloat. She replaces a motorship of the same name which was lost in 1941 while en route from Sweden to South America.

This new ship is equipped with reversible, variable pitch propellers of stainless steel. They are hydraulically operated from the bridge and are an innovation in merchant vessels of this size. The propellers are particularly useful when maneuvering in and out of port, as the ship's speed is promptly adjusted from the bridge and may be reversed if the occasion demands.

The Suecia is one of the fastest motorships of her type ever assigned to the important Pacific Coast European trade routes. All of the line's vessels assigned for this trade are especially equipped for the handling of large refrigerated shipments of fresh fruits, bulk oil in deep tanks, as well as canned, dried and evaporated fruits and general cargo.

Far East Company Opens Seattle Office

Progress in financing the recently organized Far East Steamship Company, which will operate cargo vessels from Seattle to the Orient, is being made, and an office has been opened at 208 Columbia Street. The authorized capital stock of the organization is $500,000, which will later be increased to $1,000,000.

John Cormode, president of the new company, was formerly vice president of the American Mail Line and has had wide experience in shipping. He started his career with the Pacific Coast Steamship Company in 1914 and has held important positions in connection with Seattle's maritime commerce ever since that time.

Mr. Cormode was assistant to H. F. Alexander, president of the Pacific Steamship Company, four years and then took over the same duties for the late A. F. Haines, who was vice president and general manager of both the American Mail Line and Pacific Steamship Company.

He was one of the three members of the creditors' committee which was largely responsible for the reorganization of the American Mail Line. He resigned late in 1941 and since that time has been connected with the Lake Washington Shipyards.

Master at Age of 22

The honor of being the youngest master in the merchant marine was claimed for Maritime Service Lieutenant Harlan Hall, age 22, of Diamond Springs, California, by Captain

Claude Mayo, Superintendent of the California Maritime Academy at Vallejo, from which Hall graduated in July, 1942, as third mate.

Captain Mayo revealed that young Hall recently took his master's examination in a South Pacific port two weeks past his 22nd birthday, thus missing by two weeks the distinction of being the first 21-year-old master in modern merchant marine history. Within an hour after receiving his master's license, Hall was assigned to another Liberty ship as Captain, making him the youngest known skipper now serving in the merchant marine.

Consolidated Ship Captain

Doing a fine job down at the Consolidated Shipbuilding Company's yards at Wilmington, California, as trial master is Captain Don Smith, who started his career in World War I as a Navy quartermaster aboard the USS Oklahoma and the USS Balch.

After the war he continued to sea aboard vessels of the Panama Mail Line, now the Grace Line, and also with the old Dollar Line.

Captain Smith has been with Consolidated since 1941.

SPERRY AWARDED "M"

The Maritime "M," symbol of outstanding achievement in the production of materiel for the Merchant Marine, is held here by R. E. Gillmor, president, Sperry Gyroscope Company; Rear Admiral H. L. Vickery, vice chairman, U. S. Maritime Commission; John Cashmore, president, Borough of Brooklyn; Mary Feeley, Sperry employee; Rear Admiral L. C. Farwell, United States Coast Guard; and Lieut. Comdr. F. S. Hodgman, U. S. N. Ret., manager of the Marine Division.

Awarded Legion Of Merit

Lt. Col. Charles S. MacIntyre, Army Transportation Corps, awarded the Legion of Merit for his outstanding work at an advance base in the Southwest Pacific Area in 1942 and 1943, reported recently at the San Francisco Port of Embarkation for domestic duty. He was assigned to Overseas Supply Division at Oakland Army Base.

Colonel MacIntyre, former Pier Agent for American-Hawaiian Steamship Company in Puget Sound, and one of the best known shipping men on the West Coast, entered Army service in 1942. He had charge of Army longshore work in the Puget Sound area until sent to the Southwest Pacific during that year. Assigned as Transportation Officer at the advance base he surmounted the handicaps of very limited facilities and exceptionally difficult conditions to turn in a job that aided tremendously in success of the operations in that area. For his work he was awarded the Legion of Merit in August, 1943.

Colonel MacIntyre is the husband of Mrs. Karoline E. MacIntyre of 1230 Knox Place, Seattle, and the son of Mrs. Mary S. Smith, 1604 Wilshire Boulevard, Los Angeles.

Nordberg's Pacific Coast Engineer

George H. Lienhard has been appointed Chief Engineer for the Pacific Coast, in charge of installation and service of the Diesel Division, Nordberg Manufacturing Company of Milwaukee. His office is located in the Sharon Building at 55 New Montgomery Street, San Francisco.

He was formerly in charge of that company's activities in the Gulf Coast and was located in Beaumont, Texas. There he supervised all the diesel engine installations in the Pennsylvania Shipyards.

During the last five years he has been with the Nordberg Company, but previous to that time he was associated with the Sun Oil Company, as chief marine engineer on their diesel engine oil tankers. He also has to his credit one year of installing diesel engines on the tankers built at Sun's shipyard at Chester, Pa.

We wish him well in his new assignment.

George H. Lienhard, Nordberg Manufacturing Company.

Richfield's Lee Johnstone

Marine manager in San Francisco for Richfield Oil Company is popular **Lee Johnstone**, who has been on the Pacific Coast for twenty three years, and with Richfield for the last sixteen years, where he has a host of friends all up and down the coast.

His background as a marine engineer covers the four corners of the globe.

Lee B. Johnstone, Manager of marine sales, Richfield Oil Corp.

Winder R. Harris, vice president, Shipbuilders Council of America.

Former Congressman Appointed To Shipbuilders Council Of America

Former Congressman Winder R. Harris of Norfolk, Va., has been appointed vice president of Shipbuilders Council of America, according to a recent announcement by H. Gerrish Smith, president of the organization.

Mr. Harris, who has tendered his resignation as representative of Virginia's Second District, will head the Council's new Washington office.

"The great expansion of the shipbuilding industry," Smith said, "demands close contact with governmental agencies to assist in the handling of the many problems of this industry, which will become even more complex at the end of the war, when contract termination, renegotiation and collateral matters will come up for consideration.

"In selecting Congressman Harris, we believe we have a competent, experienced and capable executive who will serve this very essential industry with distinction and credit both during and after the war," Mr. Smith added.

Mr. Harris is a former newspaperman and Washington correspondent. He has served in Congress since April, 1941.

The Washington Office will be located at 1029 Vermont Ave., N.W.

Drummond Appointed Port Captain at Marinship

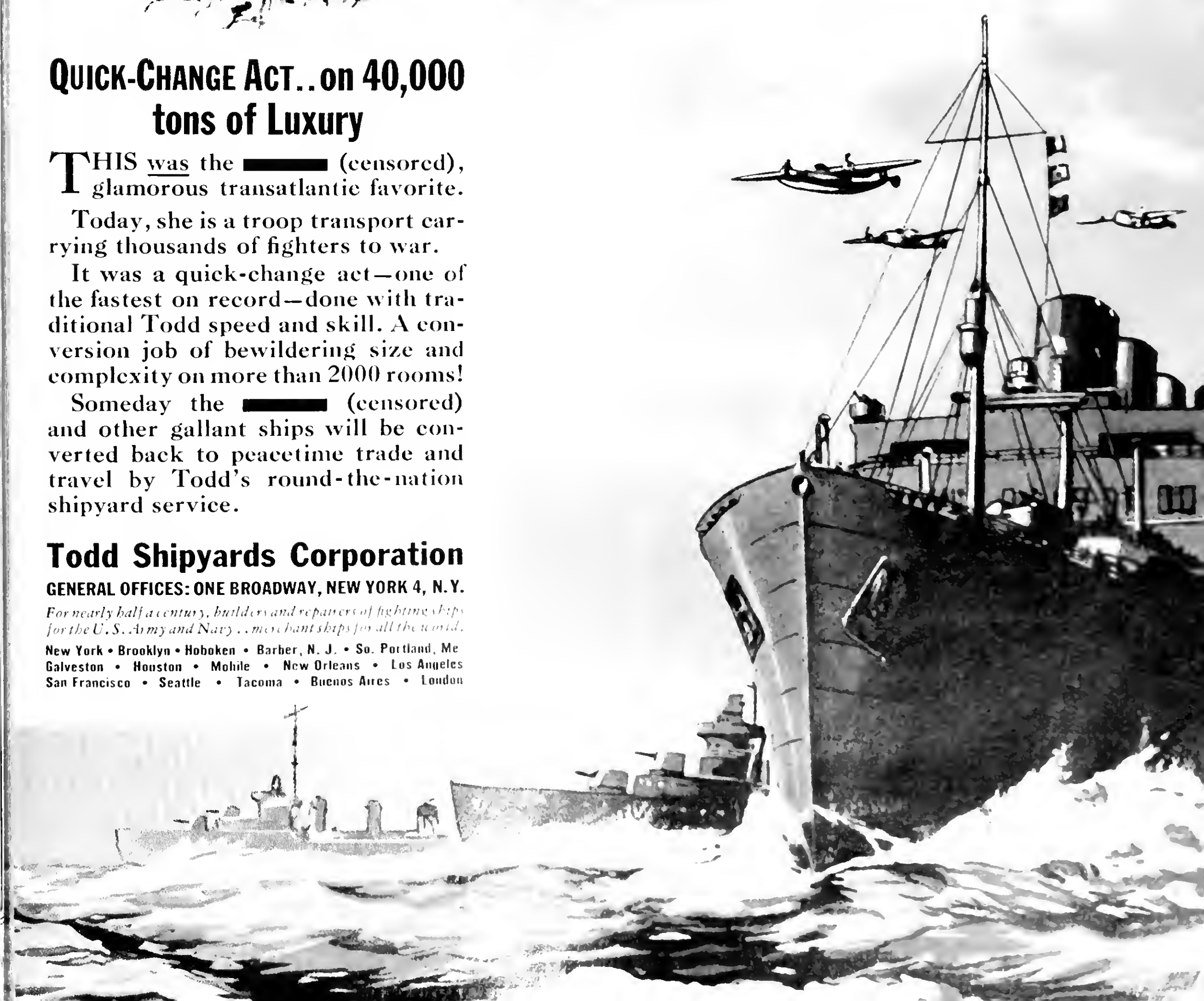
Appointment of Captain **Robert R. Drummond** as port captain at Marinship, succeeding Captain J. W. Fowler, who has been named to membership in the San Francisco Bar Pilots Assn., was announced by W. E. Waste, general manager of the yard.

Captain Drummond began his duties at the Sausalito shipyard on July 11, and Captain Fowler terminated his work then on July 18. Both men are experienced and able masters with wide reputations in their field.

Captain Drummond's 30 years of sea experience began when he was a lad apprenticed on sailing ships operating out of Scotland. After becoming first officer on the wind-driven vessels, he became a master in 1920 when he was with the Pacific Mail Steamship Company, on the Venezuela and Equador. He later sailed for the Oceanic Steamship Company and many other lines, and in 1941 he was called to active duty with the U. S. Navy. Returned to reserve status, he was captain of the ships Bering, George S. Boutwell and John F. Shafroth for Alaska Packers.

Pacific Marine Review

DECEMBER 1944



Pacific MARINE REVIEW

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Northwestern Rep.

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American Shipping Unity

Pacific Marine Review

Out of the chaos of war and the confused struggle to maintain shipping and shipbuilding schedules there seems to be emerging a semblance of desire for unity among American ship operators. This was evidenced in the formation early last summer of the National Federation of American Shipping with a potent unifying personality—Almon E. Roth—as its executive head.

All of the signs on the American ship operators' road to successful overseas or domestic traffic, under private ownership, point directly at the need for unified action. This action is needed to formulate adequate post-war plans along many lines of common interest to the whole shipping industry.

Admiral Land indicates in a recent speech that the Maritime Commission and the War Shipping Board are getting ready a proposal to "streamline" the various agencies concerned with shipping by setting over them a "Shipping Department" that would unify Federal control of shipping. Since Admiral Land as head of WSB manages just such a department over all American shipping, for the duration, this suggestion is very important—particularly, if it includes the Maritime Commission or if that Commission in fact becomes the proposed department.

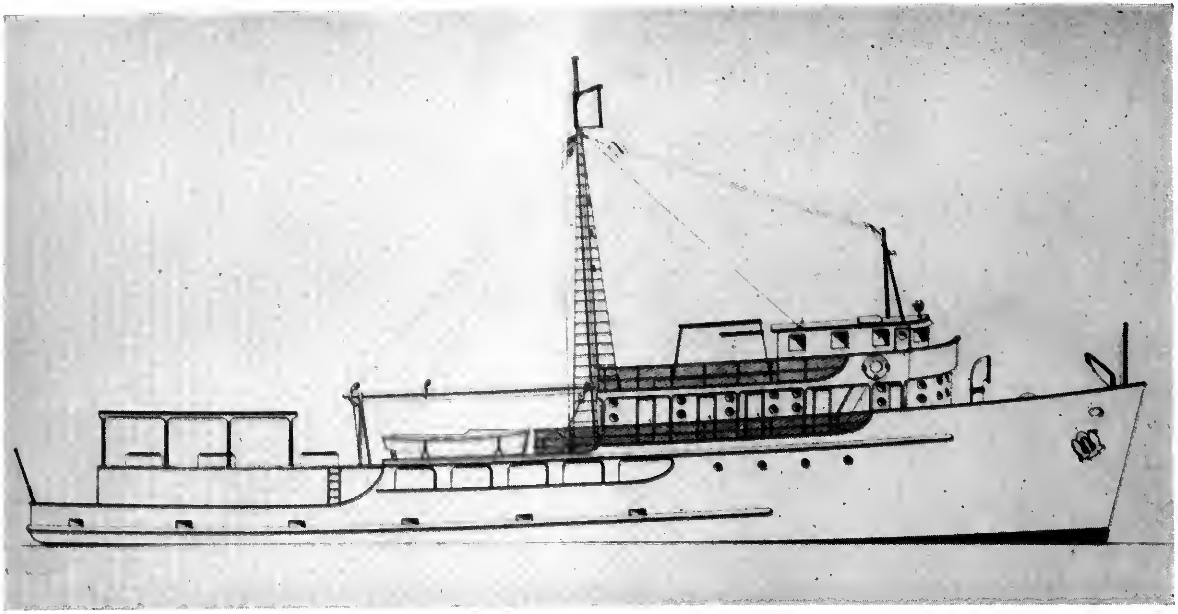
The merchant marine situation at the close of this war will be very different from that which faced American ship operators at the close of World War I.

Then we had a small fleet of slow freighters in operation and a very large fleet of the same type of cargo vessels building.

Now we will have the largest fleet of slow, obsolete, comparatively new, cargo vessels that has ever existed in the world's history. Along with this fleet we will have another fleet of fast modern cargo and cargo-passenger type liners that will be ample to take care of our commercial needs. This second fleet, however, is largely in the hands of the U. S. Navy and the U. S. Army and has been converted by them for their own uses as transports or special cargo or other types.

To date there is no Federal announcement of policy regarding these vessels now owned or chartered by army and navy. We are told by those who know shipbuilding, and it is our own impression from inspecting some of these vessels, that the cost of reconversion on many of them would equal the cost of new tonnage.

Everyone concerned seems to be in agreement on the idea that part of the surplus ships should be put in storage for a future emergency. If the shipping industry and the government could agree strongly that the merchant ships that are in the hands of the army and navy should form the nucleus of the laid up fleet the future of the shipping industry would be much more secure and the shipbuilding industry also would greatly benefit. It is our opinion that the Liberty ships should be sold on the world's shipmarket to tramp operators without special restrictions of any kind. Those that cannot be sold for operation should be sold for scrap steel. An E-C2, obsolete by twenty years or more when her keel was laid and planned simply for war service, is not the type of hull or machinery that can be of much use after a twenty year lay up. Space forbids development of these points. Let every ship operator do some thinking on this idea.



Outboard profile of the new 125-foot all-steel tuna clipper being built for the Southern California tuna fleet.

Prefabricated Steel Tuna Clippers

AMONG THE PEOPLE on the waterfront the question is—"What are fishing craft going to be like after the war?" The answer is that they are going to be faster, more graceful, more economical, and more comfortable. This is illustrated by an all-steel tuna clipper type designed by G. Bruce Newby, naval architect of Long Beach. The first three of these vessels are now being built by the Steel Shipbuilding Division of the United Concrete Pipe Corporation at their Long Beach, Calif., plant. This vessel is typical of the strides forward in the small shipbuilding industry.

The initial development of the modern tuna clipper dates back to the years 1924-25 when the albacore, in commercial quantities, disappeared for no apparent reason from the waters off the coast of Southern California. Their disappearance necessitated the development of a long range fishing boat that could go far south—as far south as the waters off the coast of South America. The first fishing boats used for this purpose were mere adaptations and conversions of the boats then in use. But the long trip involved and the tropical conditions encountered necessitated specialized types of boats. The development of a special type of boat to meet the conditions, culminating in the large size tuna clipper now in production, is a saga of ingenuity in California boat yards, and of daring activity at sea.

Fishermen in boats no longer than 60 and 70 feet have fought tropical storms—tuna clippers with fabulously valuable cargoes race for the markets—some ships never return—witness the clipper "Belle Isle," which put out from San Diego and mysteriously disappeared in the Gulf of Panama, leaving no trace of the crew or vessel although she was equipped with short-wave radio telegraph. Wrecks of others are marked on the United States Hydrographic Office Charts. Sometimes, when a boat returns from its long trip, there will be a man missing, and always there are stories of strange accidents and near accidents. A fish once jumped from the sea and closed its jaws around a fisherman's throat; a surgeon aboard the yacht "Zaca" saved the man's life.

The tuna clippers now in production, at Long Beach shipyard of the United Concrete Pipe Corporation, are of all-steel welded construction, prefabricated and partly preassembled.

The principal dimensions of these single screw tuna clippers are given in the table herewith:

Principal Dimensions

Length Over All	125′ 6″	
Length on Load Water Line	121′ 6″	
Length Between Perpendiculars	115′ 0″	
Beam Molded	27′ 0″	
Depth Molded	14′ 0″	
Brine Well Capacity Under Deck	8640 Cu. Ft.	216 Tons
Brine Tank Capacity on Deck	2160 Cu. Ft.	54 Tons
Total Fish Tons Capacity		270 Tons
Fuel Oil Capacity		40,000 Gals.

General Description

A profile view of these vessels shows that they have a raised-deck forward and a raked stem. The stern is on true cruiser lines and thus is finer than the modified stern used in many fishing boats. The hull is of electric welded ship plate, varying in thickness from 3/8" to 1/4". The stern frame is a built-up weldment of plates, flush welded to give a perfect streamlined flow of water to the propeller.

The vessels are of double bottom construction with a central vertical keel. The double bottom has eight separate tank spaces for fuel oil, four under the machinery space and four under the brine wells.

The hull is divided into six watertight compartments, which form: the forepeak tank, used for fresh water; a deep fuel oil tank; the machinery space; the brine wells and shaft alley; and the afterpeak tank and lazarette.

On each side of the shaft alley are located the brine wells which are secured in place by girders, top and bottom, as well as fore and aft. There are five brine wells on each side of the shaft alley, extending from the shaft alley to the shell and from the tank tops to the deck.

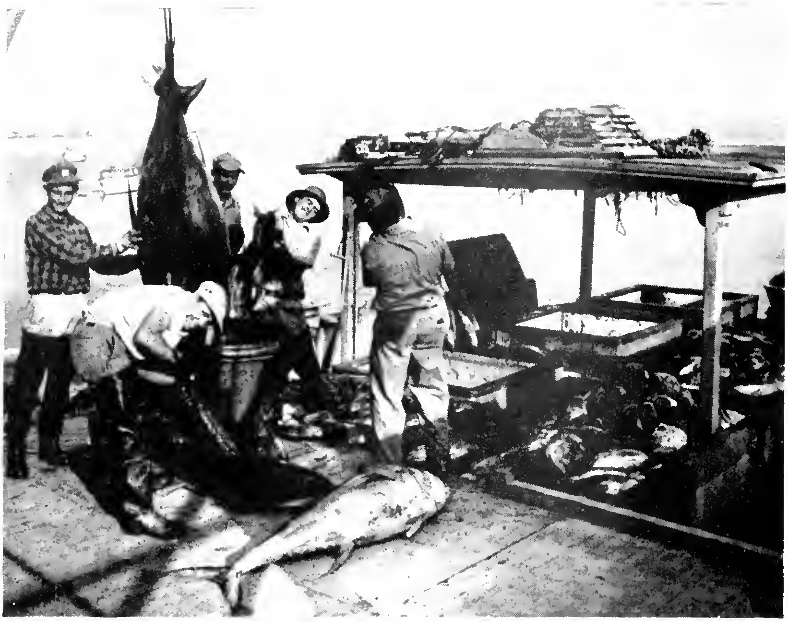
The main deck is steel plate, flush welded. On this deck forward of the forecastle bulkhead is located the upper machinery space, as well as the refrigerating compressors, cold storage rooms, machine shop, and general store rooms. Aft of the forecastle bulkhead on this deck are arranged the combination galley and mess room, partially enclosed well deck, and bait tank. The bait tank enclosure has four subdivisions, three bait tanks insulated to carry frozen fish and a condenser tank.

On the forward part of the vessel and above the main deck is a steel, flush welded, raised-deck. An insulated steel deckhouse is located on the raised-deck and has accommodations for sixteen of the crew. The bridge deck over this has a wooden deck laid over the steel plates with a

Top of page: A big tuna breaks the water and four fishermen strain to bring him aboard. These action photos were taken off the coast of South America.

Center: A three-man team get the best of a 100-lb. tuna, only to have it drop on them.

Bottom: The Viking at a fisherman's dock upon return from her maiden voyage to the fishing banks near the Galapagos Islands.



A group of young fishermen unload frozen fish from the Viking.

2" air space between. The pilot house, on the bridge deck, has the same type of wooden deck over its steel top.

Aft of the pilot house, on the bridge deck, there is a raised steel fidley with hinged covers on each side of the stack, allowing ample light and air to reach the machinery space. The fidley top is bolted in place so that it and the streamlined stack may be removed to clear a large machinery hatch way.

The vessels have a single mast and one cargo boom, rigged in tuna boat style. A large skiff, a small skiff, and a 16-foot power boat, are all stowed on the raised deck.

Propelling Engines

Propulsion in the first three of these vessels will be furnished by a six-cylinder directly reversible Model VDSS Superior Diesel engine rated 840 hp. at 300 rpm. The cylinders are 14½" x 20" and the engine is fitted with an Elliot Buchi exhaust turbo supercharger. Oil cooling is used for the pistons and fresh water cooling for the cylinders and heads with a cooling water heat exchanger served by cold salt water. The pumps for these systems are built into the engine. The engine drives the propeller through 6¾" line shafting and a 7½" rubber covered tail shaft.

Auxiliary Machinery

For auxiliary power and lighting two 200 hp. Atlas Diesel engines turning 500 rpm. and connected to Fairbanks Morse a.c. generators, furnish 125 kw. apiece or a total of 312 k. & a. electric energy.

Pumping systems include: a bait water circulating system discharging 8,800 gpm. at 18' t.d.h.; a brine transfer and emergency bilge system capable of transferring brine between any two tanks or discharging brine overboard or pumping bilges; a brine circulation system for maintaining circulation in each tank; a fuel oil transfer system; a circulating salt water system for the heat exchangers; a fire and washdown system connected also to the bilge eductors; a sanitary fresh water system; and a sanitary salt water system. There are 21 pumps all Fairbanks Morse; with a total motor load of 110 hp.

The refrigeration system is the most important auxiliary on a tuna clipper. On this boat it is of the builders exclusive design and is the result of considerable research and development. The three main compressors are 6"x6" single acting Kohlenberger, each driven by a 25 hp. motor through belt drive. This main system is capable of handling 125 tons of tuna on the first day's catch. There is an auxiliary refrigeration system for the galley and storage lockers consisting of a 3" x 2" ammonia compressor.

There is a gear-type steering gear with roller bearing carrier for the rudder stock and ball bearing thrust housed in a steel box. The steering device may be either manual or power operated.

In these vessels the propulsion machinery is set very low which gives ample positive gm. — to insure stability. The vessel rolls steadily and rides easily— thus providing a good fishing platform. For fishing, the stern can be trimmed until it is practically flush with the sea, and when under way trimmed to a 24" free board.

A young fisherman pulls a 75 - lb. tuna from a well where they are kept frozen.

ASSEMBLY METHODS AT UNITED CONCRETE PIPE CORPORATION SHIPYARD

Upper left: The "production line" at the Steel Ship Division of the company.

Upper right: A deckhouse is lifted into place in preparation for welding to the hull.

Lower left: Looking down the slip of the marine railway. A vessel can be seen in position to be lifted.

Lower right: The same ship being pulled from the water for repair service.

This trimming is accomplished by the transfer of fuel oil.

The sides and ends of crew's quarters have spun glass insulation with ply wood interior finish. The floors are wood over steel with a 2" intervening air space, arranged for constant circulation of air. All berths are equipped with individual fans.

There is a large forward cowl ventilator equipped with an intake fan which supplies air to the lower part of the ship. Additional ventilation is secured by the use of two up-cast ventilators, with exhaust fans in each, which terminate in the fidley. Large vents draw the heated air from the galley through these ventilators and complete change of air in the machinery space occurs every five minutes.

The radio system is a combination commercial radio and radio telephone, rated at 500 watts.

All tanks are steel. All tanks, throughout the ship, are insulated with 6" of cork, 44,000 board feet of the material being used for this purpose.

Production of these modern tuna clippers is by prefrabrication of the hull sections, such as deckhouses, keel sections, or bulkheads, at the United Concrete Pipe Corporation, Baldwin Park Plant, 35 miles from the nearest tideland. These sections are transported to their Long Beach shipyard and assembled on a "production line." Six sections with the piping installed make up the hull of the tuna clipper. These sections are moved on huge trailers to the shipyard as they are needed and assembled as soon as they arrive. This procedure lends itself to economy in production. It also helps to relieve the critical manpower situation, found in any harbor area due to the recess of congestion, by having a major part of the work done a distance away from the waterfront.

When the boat is completed she is launched on the company's large marine railway which lowers the boat into the water slowly and without risk of damage. By reversing the launching process ships can also be pulled from the water. This facilitates rapid repair work.

One of the powerful U. S. Navy Fleet tugs built by United Engineering Company of San Francisco at their Alameda yard.

Seagoing WAR TUGS

By Andrew P. Hall

SOME TIME before the outbreak of the war the U. S. Army, Maritime Commission, and Navy embarked on a very extensive program of tug building. These little vessels are absolutely indispensable to the operation of any naval or mercantile fleet, and already many stories are on record which make thrilling reading in our naval annals. It is the purpose of this article to outline briefly some of the requirements and chief characteristics, which are incorporated in the design of these doughty little vessels, particularly those types which are engaged overseas in the Pacific War.

While features of design vary according to the class of work to be performed, generally speaking three main features are essential in the design of a tug: first, maximum stability; second, towing power and ability to handle craft in rough weather and, third, strength of construction.

A tug has to be ready to pull, at a moment's notice, in any direction, and then again she must alter her course without sacrificing her towing power. Naturally she must have that amount of good stability which every vessel must have, in order to contend against wind and sea, plus as much again, against pulling strains which may come from, what is at the time, the most difficult and dangerous angle. Plenty of beam and a relatively low center of gravity will help take care of this situation. Tugs of

An excellent example of the streamline trend in modern commercial tugs, the Justine was built by Pusey & Jones.

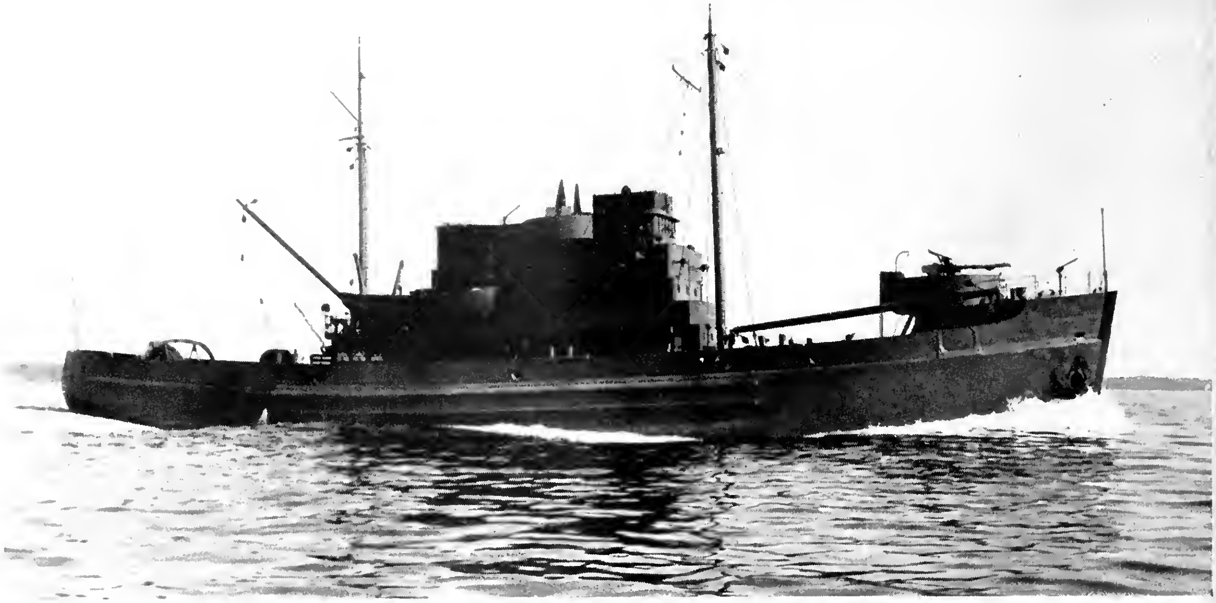
narrow beam often have to ease up or take the strain off the ropes when in a very awkward and sometimes dangerous position. The after end of the tug should be built as low as is compatible with safety, so that the natural reaction to a heavy side pull will tend to drag the tug bodily to port or starboard rather than tip her over. There should also be as little as possible top hamper above the weather deck, only very essential equipment being located there. No additional heavy equipment should ever be located there, unless the designer is satisfied that the very safe margin of stability is fully maintained.

It has been found by experiment that when under full load a screw tug tows at approximately 70 per cent of the maximum speed of which she is capable when running free with no tow. When the load is taken and the hawser becomes taut, the engine naturally labors more heavily and the thrust per square inch on the propeller blades is much greater. The draft therefore should be as great as possible—hence the trim aft—in order that the propeller get a good and proper "bite" on the water. She cannot afford to be lethargic and a small immersed section in relation to displacement is deemed necessary in order to obtain the most satisfactory results.

A tug when towing is subject to a great variety of strains and stresses, both local and overall. The designer must provide for these sudden and violent strains in all directions, and even from different planes, dependent on the height of the ship towed, the swell on the sea, and other factors. In most types, especially for heavy work, extra weight carefully placed is an advantage, so there is no necessity to reduce the scantlings, the hull, or the thickness of the plating. In fact, some designers make a practice of increasing the depth and thickness of the sheer strake beyond the classification rule requirements.

Seagoing war tugs may be divided into two classes, seatowing and salvage. For open sea voyages the former require good seagoing qualities, fair size, large bunker capacity and good accommodations for the crew. These tugs must be designed and equipped so that the crew will always have confidence to tackle the most difficult jobs under any circumstance. Such tugs are usually called upon to handle tows of loaded barges and special service craft, which have no propulsion plant of their own. The U. S. Army operates a fleet of all-welded steel tugs, of this type, which have given very satisfactory service wherever they have been employed. They are 123 feet long by 30 feet beam and have a draft of 13 feet. The propelling plant is a 2-cycle diesel of 1225 hp. at 3[illegible] rpm.

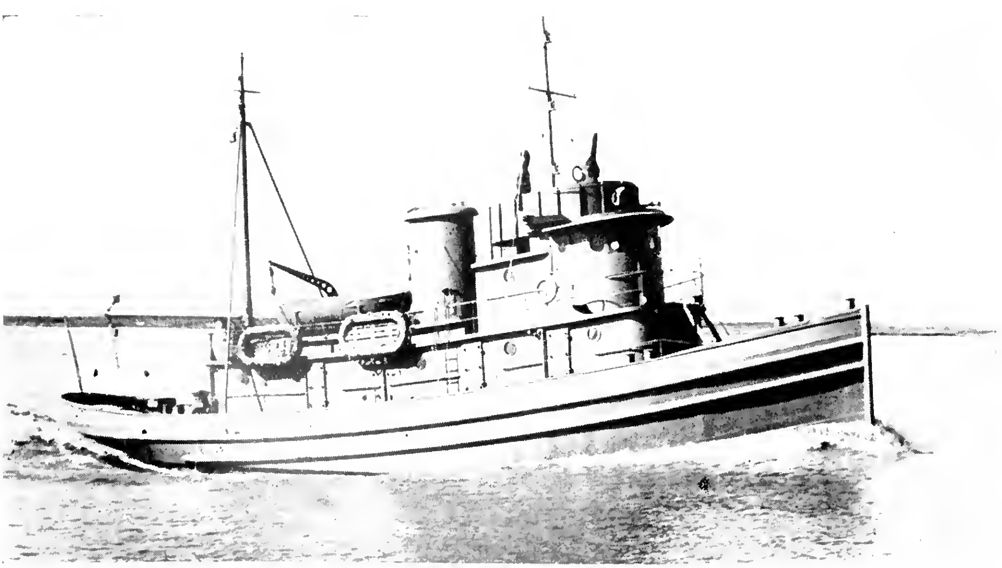
Particular mention might be made of the U. S. Maritime Commission seagoing tugs of the V4-M-A1 type, which have turned in some remarkable records during the last 18 months. One has crossed the Pacific Ocean with a tow of three barges, each of 12[illegible] tons deadweight; another towed a damaged freighter 95[illegible] miles; still another group of three towed an 18[illegible]-ton floating dry dock from a gulf port to Trinidad, and so on. These hardy vessels are 194 ft. 4 in. long by 34 ft. 6 in. wide with a draft of 15 ft. [illegible] in., and are powered by two diesels with a



A typical U. S. Navy 187-foot salvage tug. This vessel is equipped with four Cooper-Bessemer type GN 6-cylinder diesels driving 300-kw main propulsion generators.

total hp. of 2250, which drive a single propeller via electric clutch and reduction gears giving the hull a speed of 14 knots.

In the top size of these seagoing Trojans we have the large combination seagoing and salvage type built for and operated by the U. S. Navy. This type is designed for duties which are often an aftermath of naval engagements, although possessing all the features of large seagoing tugs they are also equipped with a large salvage pump capacity and ample derrick crane facilities capable of lifting large portable salvage pumps on board the vessel to be salved. A good size hold for stowage is provided, and the deck spaces are kept fairly well clear of obstructions. An automatic towing winch located as low down and as near the center of lateral resistance as can be conveniently arranged, is an advantage, with the tow rope led over a fairlead at aft end of deckhouse and over the stern to the "tow." This tug has the necessary speed to take her to the "tow" in a hurry, her diesels developing 3000 shp. at a speed of 15 knots, and driving the propeller through electric speed reduction. Her dimensions are 207′ 0″ x 43′ 0″ x 13′ 0″ mean draft with a load displacement of 1830 tons. In naval circles the records of these vessels are well known, but the public must await the end of the war for the story.



The Resolute, which with her identical sister ship, the Intent, made the long 19,000-mile trip from Port Arthur, Texas, to Massawa and thence to Naples. Both are powered with GM diesel engines.

With the Naval Architects And Marine Engineers

The Society of Naval Architects and Marine Engineers held its fifty-second annual meeting at the Waldorf Astoria, New York, on November 15-16-17 and 18. A good cross section of the membership attended the various technical sessions and as usual the annual banquet was sold out exclusively to members.

Eleven technical papers were presented at the four sessions. Abstracts of some of these papers follow:

The Circulating Water Channel of the David W. Taylor Model Basin

By Capt. H. E. Saunders, U.S.N.
and
Lt. Comdr. Clyde W. Hubbard, U.S.N.R.

This is the story of the development, construction and use of a circulating water channel now nearing completion at the National Towing Basin. In this channel models are held stationary and the action of the rapidly moving water on the model may be: measured dynamically by suitable instruments; observed visually at the surface, or subsurface from either side or from the bottom; and photographed from any angle. This is the first large-scale installation of its kind in America and probably the first in the world presenting a free water surface. It should prove of very great value to designers of hulls. A good idea of the design and the size of this addition to the National Model Basin may be gained from the section reproduced herewith.

Above: Section through test section window frame. The joint at the beveled edge of the glass was originally to have been made up with aquarium cement but Rose metal was finally used.

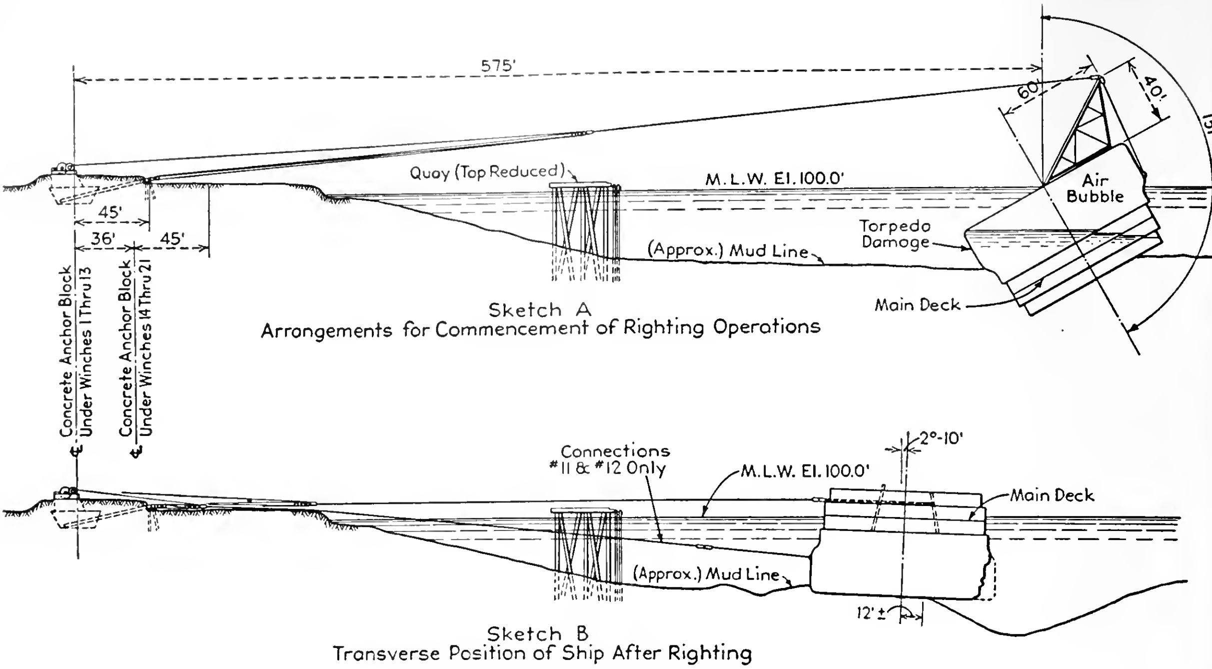
Below: Vertical longitudinal section through TMB water channel. This is a section offset from the middle line and run through the centerline of one of the pumps. The channel has a constant inside width of 22 feet and a rectangular section everywhere except at the pumps and in the upper and lower transition sections in Elbows F and G. These elbows and the pump rings are in pairs, separated by a central pier 18 inches thick. The axis of the enlarged section slopes downward to correspond with the slight slope in the test section, and the enlarged section is symmetrical about that axis. The vane arrangement shown in Elbows E and H is the original construction; tests are under way at the time of writing to modify this arrangement to improve the flow.

Salvage of U. S. S. Oklahoma at Pearl Harbor

By Captain F. H. Whitaker, Hull Supt.
U. S. Navy Yard, N. Y.

A long detailed paper describing the preparation of the hull for righting operations: the methods used in righting the hull: the preparation of the bottom of the harbor to allow full righting: the refloating operations: and the dry docking. About 410 men were lost inside this battleship which capsized very rapidly due to severe torpedo damage on the port side. The diagrams reproduced on page 70 show graphically how the job was done by the Pacific Bridge Company, under supervision of the U. S. Navy Salvage Section at Pearl Harbor.

The preparation for righting took 7¾ months: righting occupied 3¼ months: preparation for refloating 4½ months: refloating and preparing for drydock 1¾ months: total time 17¼ months. Martin Decker strain gages were used to measure the pull on the righting cables.



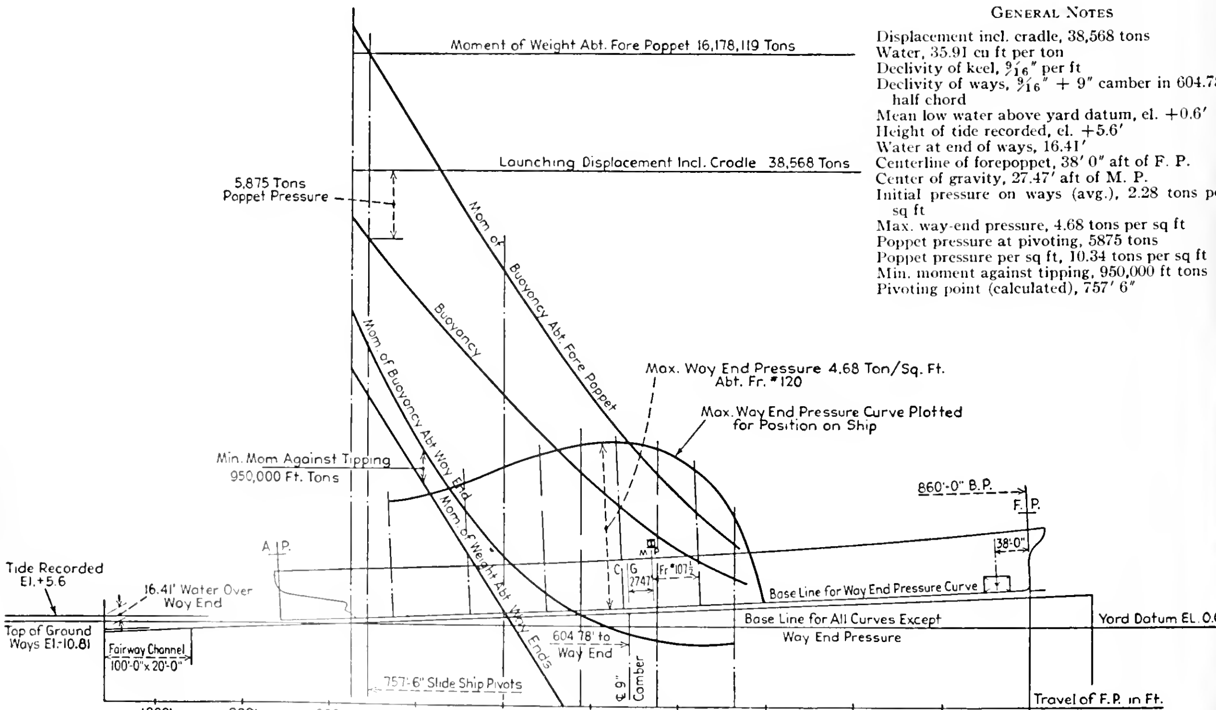
Salvage of U.S.S. Oklahoma (see page 69)

Launching of U. S. S. New Jersey and U. S. S. Wisconsin

By Rear Admiral Allan J. Chantry, Jr., U.S.N.

A very complete launching preparation and launching data paper concerning two battleships that are said to have had the largest launching weight ever handled by a shipyard, the total weight in the case of Wisconsin being 38,568 tons. All details of procedure are recorded. The illustration herewith reproduces the launching curves for one of the ships.

Launching curves as launched, Wisconsin.



Practical Aspects of Torsional Vibration in Marine Geared Turbine Propulsion Units

By S. Curtis Powell and Wm. V. Bassett

"It is the primary purpose of this paper to present and evaluate a criterion of performance of geared-turbine units in respect to torsional vibration. The criterion described, critical excitation, is based on accepted methods of calculation, and a decade of experience has been used to establish limiting values. The manner in which reduction-gear design may be affected by a consideration of torsional characteristics is also discussed."

Authors discuss: the damping effect of propeller, turbine and shafting; the effect of gear arrangement; and critical excitation. They conclude:

"It is possible to judge reliably the acceptability of the vibratory characteristics of geared-turbined propulsion units while still in the design status. The concept of critical excitation is convenient for this purpose. Based on experience, 4 per cent is a satisfactory minimum for design. With some articulated units the best that may be accomplished is to obtain a reasonable insensitivity to periodic torsional disturbances. The best combination of details can be determined only by trying various possibilities. Tuning the two turbine branches of a cross-compound unit gives good results where the physical arrangement of such a system is practical. Articulated units with relatively stiff quill shafts and nested gears have in general only one critical speed within the operating range, and for this mode of vibration the critical excitation is considerably higher than the appropriate design minimum. From an overall standpoint such units are usually the best that can be obtained with conventional arrangements."

Aluminum Base Alloys in Marine Exposures

By R. B. Mears and R. H. Brown

Aluminum and aluminum alloy boats and parts of vessels have been used since 1894 wherever light weight was a desirable factor. At first alloys of aluminum and copper or aluminum and zinc were used in marine work, but in recent years the use of magnesium and silicon alloys with aluminum has been developed. Today the Alclad sheet alloys, especially Alclad 24 S-T are being widely used for construction in both surface and flying boats. Results of laboratory tests are given. Perhaps the most interesting test from the practical operator's point of view is that on the "Alumette" which is a structure simulating the actual midship section of a 100 foot patrol boat. This float had a length of 13 feet, a beam of 10 feet, a depth of five feet and a draft of 2 feet 4⅝ inches. It was equipped with: stern tubes; dummy shafting and propeller; and a pipe system. Displacement with ballast was 11,800 lbs. This experimental hull has been moored in the James River estuary at Newport News, Virginia, for eight years. During that time experiment with various paints have been made and contact with dissimilar metals tried to get galvanic action. The main conclusions are summarized as follows:

"(1) In agreement with the results from small specimens, it was found that the aluminum-magnesium alloys, such as 52S, 53S and B214, are highly resistant to sea water exposures.

"(2) Contact between aluminum-base alloys, such as the above, and dissimilar metals, such as steel, stainless steel or bronze, in sea water exposures results in galvanic attack on the aluminum alloys. This attack can be prevented by electrically insulating the dissimilar metals or by use of zinc attachments for cathodic protection.

"(3) Anti-fouling paints, containing copper oxide as the active agent, accelerate the attack of aluminum alloy surfaces with which they are in direct contact. This attack can be prevented by the use of an undercoat of a zinc chromate primer.

"(4) Vessels with hulls sheathed with appropriate aluminum alloy plates will not require repainting at any more frequent intervals than would similar vessels sheathed with steel plates."

The authors are respectively, Chief and Asst. Chief of the Chemical Metallurgy Division of Aluminum Research Laboratories.

Economic Considerations in the Design of Future Combination Passenger and Cargo Ships

By John E. Stater

This paper is composed of analyses from the ship operators' viewpoint of: factors influencing total volume of passenger traffic; factors influencing types of vessels, relative profits of passenger and freight services; effect of air line competition; and passenger traffic remaining to surface ships. The author is Executive Vice President, American Export Lines, and his analyses are almost exclusively based on transatlantic figures. He concludes:

"**First.** Freight traffic generally is much more profitable when handled in a cargo vessel.

"**Second.** Passenger traffic has been most profitable on all-passenger ships, especially in the superliner category.

"**Third.** On all combination ships, except those with relatively small passenger accommodations, passenger traffic is essential to the profitable operation of the vessel.

"**Fourth.** The impact of business lost to airline competition will be greatest on the largest ships, such as the superliners, because of necessary rate reductions and lost traffic

"**Fifth.** The impact of air competition on the medium size vessel will be less (a) because rates will be less affected, (b) because results in previous years indicate a somewhat more stable passenger traffic, and (c) because the important freight revenue from such vessels will be unaffected

"On the other hand, the studies do show clearly that on the medium size ship large passenger revenue must be obtained because of the difficulty, or impossibility, of such vessels operating as cargo ships only. Therefore, future passenger traffic is absolutely essential to this type of vessel."

(Page 114, please)

This is the volcano-like eruption that results when the chemical reaction takes place in the crucibles and the white hot metal pours into the mold box. It takes just 20 seconds for the temperature of the thermit mixture to reach 5400 degrees, at which point the pins at the bottom of the cones are tapped and the metal allowed to pour into the box.

THERMIT WELDING *at Calship*

By Howard DeFreitas

DEFINITELY a major undertaking that requires skill, thoroughness, careful preparation and accurate timing, thermit welding has provided an amazing chapter to the success story of the California Shipbuilding Corporation on Terminal Island.

A department which was not even required while the big Maritime yard constructed 306 Liberty ships and 30 Liberty-type tankers, thermit welding came into being at Calship when work was begun on Victory ships and the now especially vital attack transports. On these vessels the stern frames and bow stems come from the vendors in sections and the thermit process is used to make them ready for installation. The stern frames arrive in four or five sections and weigh 37 tons. The bow stems, which come in two sections weigh six tons.

With this procedure, the problems of manufacture, handling and transportation are simplified and assemblies are produced that are equal in strength and all other respects to one-piece work.

Thermit welding is not a new process. Scientific discoveries leading to it were made prior to 1895, the initial patent was granted in 1897 and the method was introduced in America by the Goldschmidt Thermit Company, organized in 1902. In 1918 this company became a part of the Metal & Thermit Corporation.

Thermit, which is a mechanical mixture of finely divided metallic aluminum and metallurgically processed iron oxide, has been used for some time in the marine field for repairing broken stern frames, connecting rods, anchors, shafts and other heavy parts. It has also been employed in the welding of rail joints for steam, electric and coal mine railways, in the replacing of broken teeth for large pinions and gears and in the repairing of such items as broken crankshafts, rolls and pinions, locomotive frames, steel mill housings and excavating buckets.

When the Calship yard learned that the change-over from Liberty to Victory hulls would necessitate thermit welding of the heavy stern frame and bow stem sections, it found only one man, among the yard personnel, with some experience in the process. Yet today, approximately one year since its organization, the thermit welding department stands out as one of the most efficient in the entire yard.

It was to Al Landess, a pleasant, determined man in his forties, that E. M. Kell, yard facilities division manager, gave the job of organizing

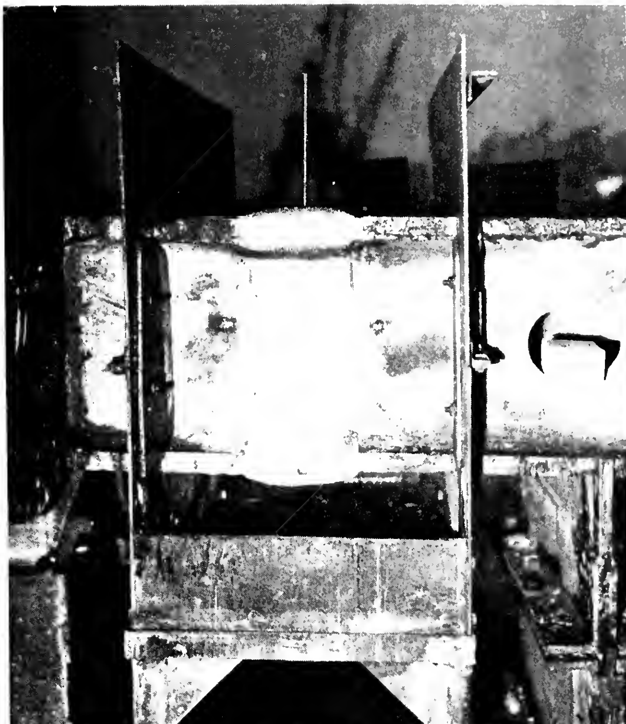
ON THE FACING PAGE:

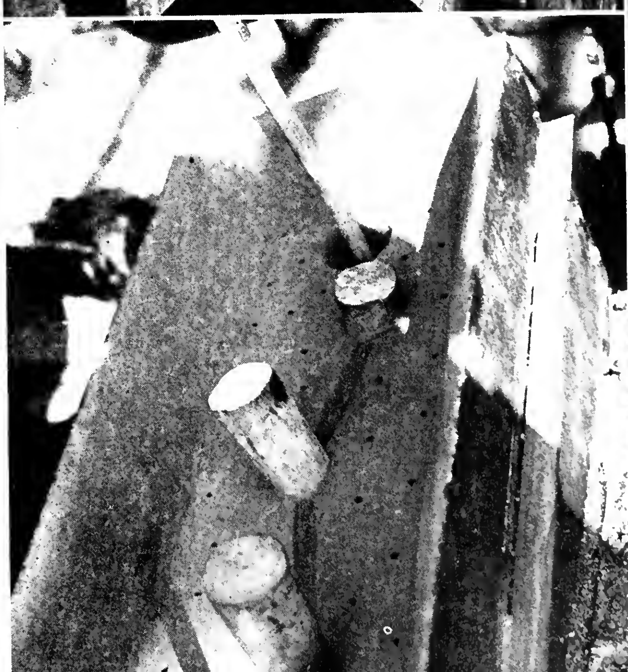
Upper left: The wax pattern around which is set up the mold box prior to the sand-packing operation. Later the wax is melted out through the heating gates, thus leaving the exact cavity for the weld.

Upper right: Packing of the sand in the mold boxes must be done in just-so manner; pneumatic sand rams are used to insure perfect packing.

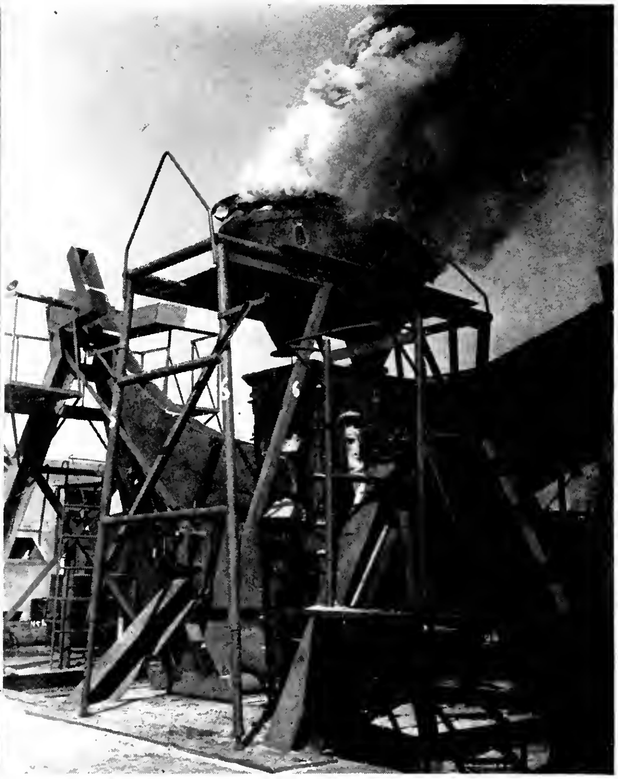
Lower left: Close-up of the mold box, showing the pouring gates on the ends and the three risers in the middle. It is from the risers that the weld draws as it shrinks. The perforation of the sand, also shown here, allows the moisture in the sand to escape, thereby eliminating the possibility of gases causing defects in the weld.

Lower right: Overhead view, showing a stern frame and four mold boxes all in readiness for the thermit process.





Crucible stand for welding stem castings being lowered into position.



Thermit welding of the cast steel stem for a Victory ship at the Calship yard.

the Calship Thermit Welding department. Landess, who had been a machinist for 23 years, did not know thermit welding, but he lost no time in learning it. He went to shipyards in San Francisco and in a week came back ready to begin setting up his department. He discovered Noel Hagerman, a man who had spent eight months in thermit welding on C-4 transports at the Kaiser Yard in Richmond, California, and immediately had him transferred from preassembly where he was working as a machinist specialist. With Hagerman as a right hand man and Kell giving him a free hand, Landess soon had the wheels of progress turning.

Ways and means were found to make adequate machinery in the yard. Men were trained to set up and accomplish the thermit welding operation. The early days were trying but soon a crew was molded together of men who seemed not only willing to learn but quick to do so. A total of 31 men, including supervisors, now comprises the department's force which is divided between the two nine-hour shifts. This force is assisted by 15 chippers.

The complete process entails these operations on one sterm frame: First, the sections must be placed on the welding slab and the ends burned to the proper length. The sections are then adjusted to exact dimensional location and are tightly anchored in position with the aid of turnbuckles. The chippers then clean the metal at the joints.

Next the crew forms a wax pattern at each joint for the weld, after which the mold boxes are set in place. Sand is packed in the boxes and up around the wax pattern. This sand forms the mold for the weld. Heating and pouring gates and risers are properly spotted in the sand. Through the heating gates, the wax is now melted out, thereby leaving the exact cavity for the weld. All this done, the stage is set for preheating through the heating gates. This heating is continued for eight and one-half hours until the temperature is brought up to 1700 degrees.

In the meantime, big cone-shaped crucibles of two-inch wall thickness are lined with magnesia tar and then filled with the prepared thermit mixture. On top of this is placed a small amount of ignition powder which is dotted with match-heads.

When all is in readiness and crucibles lowered in position above the mold boxes, the matches are lighted with hot irons. Immediately the chemical reaction takes place and in 20 seconds the temperature inside the crucible mounts to 5400 degrees. At this point, the pins at the bottom of the cones are tapped by long rods and the hot metal pours into the mold. The aluminum oxide, meanwhile goes off in a smoke and slag.

Ten hours later, the box and sand are removed, the risers and heating and pouring gates are burned off and the weld itself is cleaned. It will be noted that this process not only successfully welds large metal sections but also subjects these sections to a heat treatment which assures the elimination of distortion.

This completes the actual thermit process, now the stern frame is taken to the machining slab where a special machine tool bores and faces the stern tube boss, the rudder stock boss and the gudgeons. The finished stern frame is now ready to take its place and be welded in the hull of a Victory ship.

It was on November 27, 1943, that the first bow stem was welded at Calship and it was six days later that the first stern frame was put together. Having overcome the handicaps of inexperience, thermit welding now does two stern frames and three bow stems each week.

And, say the crewmen, "We could go faster if we had to."

100 Years Afloat

FIRST IRON HULL IN ANY NAVY

Among anniversaries being quietly observed in the United States during this war year is the centennial of the first metal-hulled man-of-war in any navy, the U. S. S. Wolverine (ex-Michigan). The anniversary also is an international "first" since this ship was the forerunner of all metal vessels in the navies of the world.

The hull of the old Michigan was built with wrought iron plates, $\frac{5}{16}$-inch thick, and all joints were riveted with wrought iron rivets. Marine writers, referring to the vessel, which was de-commissioned eighteen years ago and now lies in Lake Erie, near Presque Isle, say: "Most of her longevity may be attributed to her wrought iron construction . . ."

In mid-1842 the firm of Stackhouse and Tomlinson, of Pittsburgh, Pennsylvania, was awarded a contract for furnishing the material and building the boilers, engines and hull of this new type of warship, designed and intended for service on the Great Lakes. Although wrought iron had been known for about 8000 years, principally for its ability to withstand corrosion, the use of metal for the hull of a ship was a radical departure in naval practice. There were many who predicted that "an iron ship would sink."

All parts of the vessel were fabricated in Pittsburgh and shipped part way to Erie by barge through the old Beaver Canal. The remainder of the journey was by ox-cart. Erie was then a small fishing settlement on the lake shore.

At the scheduled launching, the vessel traveled a short distance down the ways and stuck. Efforts to free her were fruitless and were abandoned with the coming of night. The fears of many that an "iron ship" was doomed to failure seemed to be coming true.

The next morning, however, workmen were surprised to find that the ship had freed herself and was afloat, upright and dry—a vessel that had launched herself.

Designed as an iron paddler of 580 tons, the vessel was actually registered as an unarmored, unprotected cruiser at 498 gross tons, 164 feet long at waterline, 178 feet long overall, 27-foot beam, and 10 feet draft at full load. In these dimensions she is somewhat similar to the Navy's present-day 180-foot patrol craft. Old records give a full-load displacement of 685 tons.

According to all that can be learned from the documents of the time, the Michigan was built with a trough keel and five box keelsons. Simple gate valves in the trough keel provided drainage for five watertight compartments. The hull frames were made of T-iron spaced 24 inches between centers as were also the deck frames.

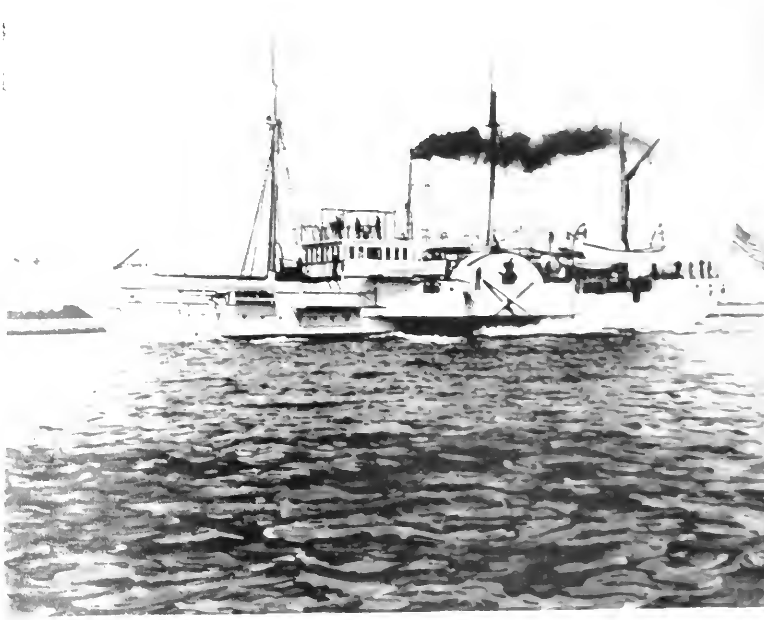
The general hull lines show a clipper bow and fantail poop with a barkentine rig. Changes were made in her superstructure in the years 1865 and 1884.

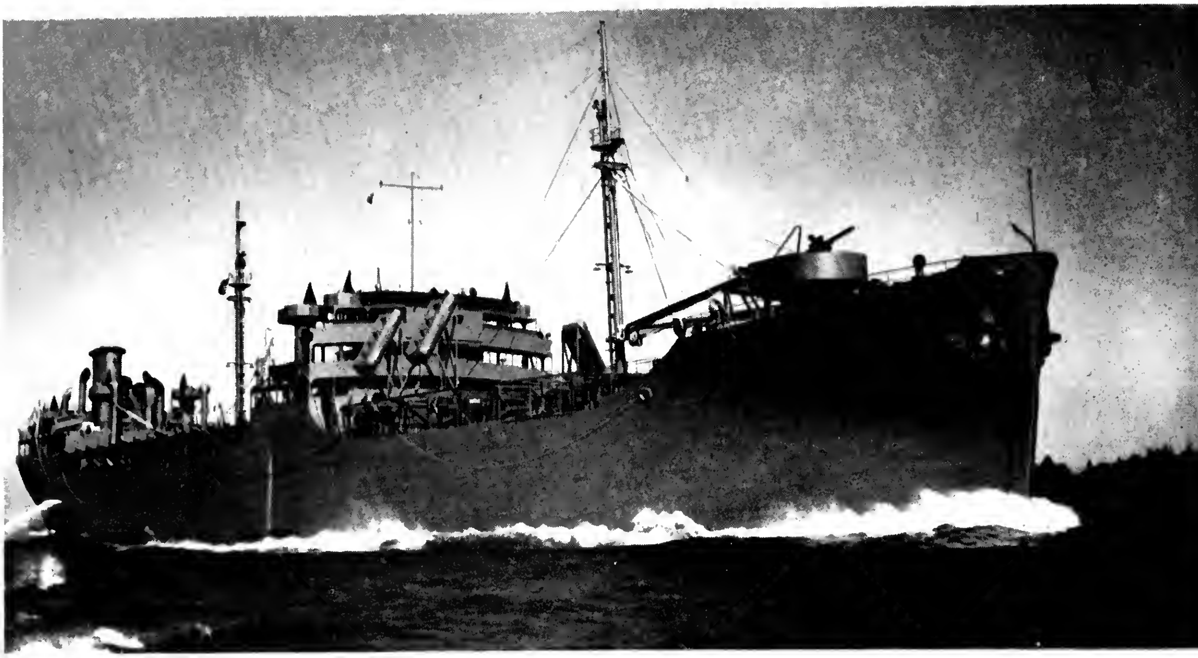
In 1844 the Michigan began her career on the Great Lakes, her first assignment being to break up an illegal Mormon settlement on Lake Michigan. This was followed by a series of lake patrols and, during the Civil War, by guard duty off a Confederate prisoners of war camp on Johnson's Island. In 1866, in conjunction with the Canadian militia, she aided in suppressing the Fenian Invasion of Canada near Buffalo.

It was in June, 1905, that the ship's name was changed from Michigan to Wolverine, the name Michigan being assigned to the original battleship Michigan, then building. For over 80 years she was the sole representative of the U. S. Navy on the Great Lakes.

During a post-war economy wave, the vessel was de-commissioned in 1926. In July, 1927, she was loaned to the City of Erie, Pennsylvania, as a relic. Later she was moved to Presque Isle.

"Most of her longevity may be attributed to her wrought iron construction," marine writers say in referring to the U. S. S. Wolverine (ex-Michigan), first metal-hulled man-of-war in any navy, launched 100 years ago. Fabricated in Pittsburgh, the hull was dismantled and moved by canal barge and ox-cart to Lake Erie, where she was launched in 1844. She is now resting near Presque Isle in Lake Erie.





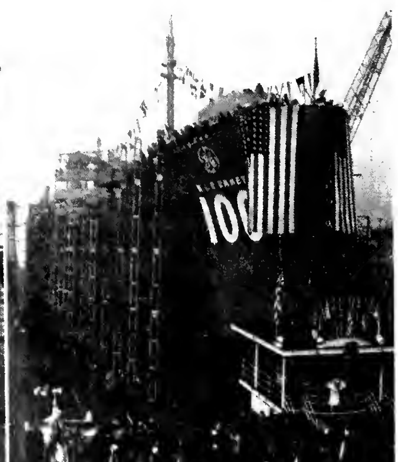
A Swan Island T2-SE-A1 tanker on trials.

100th Tanker At Swan Island

Two years and eight months back Swan Island, a flat sand bar in the Willamette River just below Portland, Oregon, was the site of the Portland municipal airport. In March, 1942, it was taken over by the Maritime Commission and a contract was given the Kaiser interests to build a shipyard there, with eight ways for tanker construction.

The W. L. R. Emmet shortly before christening.

Crowd on launching platform during the ceremonies before the christening of the Emmet.



The first keel was laid July 1, 1942, and that ship was delivered on December 31, 1942. It is a significant coincidence that in 1840 the first American vessel built on the Pacific Coast — a schooner named Star of Oregon—was built on this site.

By November, 1943, Swan Island was producing five tankers a month, today the yard is delivering six tankers a month and has held the U. S. Maritime Commission "Tanker Champ Flag" for 11 out of the past 13 months.

On October 28 Swan Island launched its 100th tanker, and very appropriately christened that ship W. L. R. Emmet.

The tankers being built at this yard are the Maritime Commission's standard design known as T2-SE-A1. T2 is a symbol for the hull characteristics. SE symbolizes single screw, electric drive. A1 symbolizes propulsion power of 6600 shp @ 93 rpm. These tankers are 523 feet

6 inches long, by 68 feet beam; of 16,530 dw tons capacity; capable of transporting 142,000 barrels of oil plus a deck load of war supplies; fitted to carry a crew of 54 and an armed guard of 28.

An electric motor drives the propeller. This motor is operated by electric energy supplied from a generator driven by a steam turbine. The turbine takes its heat energy in the form of 600 psi steam from two water tube steam generators.

The General Electric Company has supplied all of the turbo-electric drive machinery for all the tankers built at Swan Island. The company itself was honored at the occasion of the first launching of a tanker at this yard when the ship was christened Schenectady after the site of the headquarters of General Electric. Now the 100th tanker is named after the G. E. Co. engineer who first developed and promoted the electric drive idea.

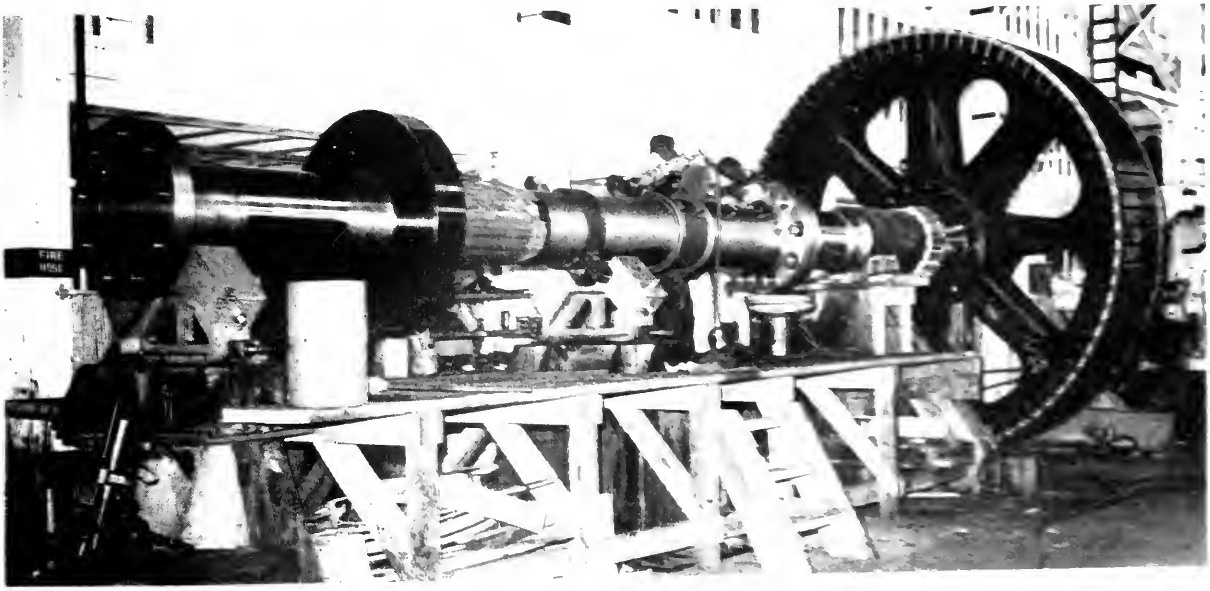
Of the electric drive and its early applications W. L. R. Emmet says in his autobiography:

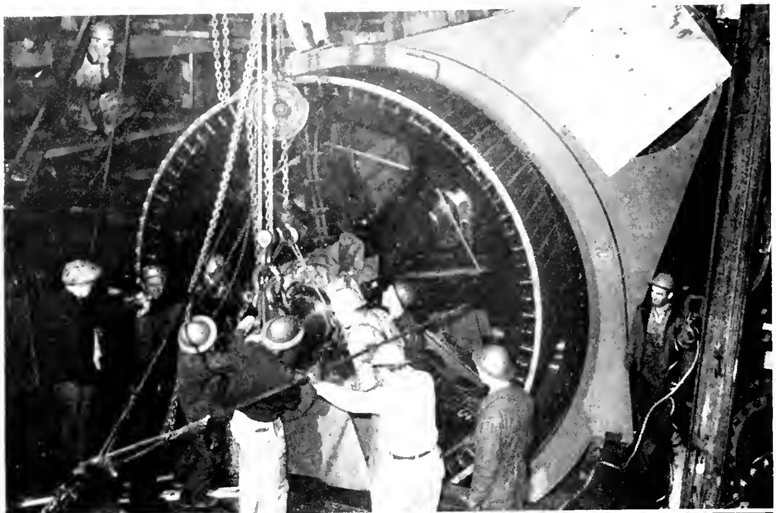
"I early saw the disadvantage of low speed turbines directly connected to propellers and thought of the possibility of electrical transmission ships so that the turbine and propeller could both be run at their most desirable speed. Our earlier turbines were not good enough or compact enough to justify their use in this way on board ships, but as soon as they became better, smaller and lighter I began to turn my attention

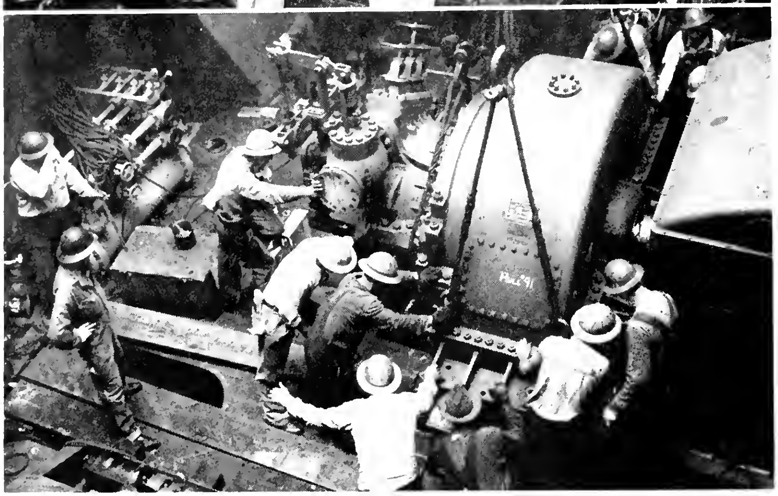
Right: W. L. R. Emmet.

Below: Sponsor's party. Left to right are, bottom row: A. S. Moody, commercial vice president, General Electric Co., Portland, Ore.; Mrs. Paul Evans; Mrs. Moody, who was matron of honor; Mrs. J. W. Belanger, sponsor; Mr. Belanger, manager, Federal & Marine Divisions, General Electric Co., Schenectady; Miss Madeleine Wetten, flower girl; and Mrs. P. Wetten. Top row: P. Wetten; The Right Reverend Benjamin Dagwell, D.D., Bishop of Oregon; Tom J. Shepherd, General Electric Co., Washington, D. C.; Carl Flesher, West Coast Regional Director, U. S. Maritime Commission Construction Division; F. Lowell Garrison, San Francisco, West Coast Representative — Publicity Divisions—General Electric Co.; Don Frederickson; and A. R. Nieman, general manager, Kaiser Co., Inc., Swan Island Yard.

Below: Thrust shaft is fitted to General Electric propulsion motor shaft at Swan Island.







Top of page: Rotor of G. E. main propulsion motor being lowered into place.
Center: G.E. turbine is set in place.
Lower left: Setting the after bearing for the 6000-hp main propulsion synchronous motor.

to the possibility of turbo-electric ship drive. My first aim was to select the case where the largest measure of improvement could be accomplished, and I decided that this was the case of the warship which needed to cruise economically at low speed and at the same time to have very large power available for high speed operation in war emergency. The function of the electric drive is primarily reduction of speed from turbine to propeller and it affords the added advantage that the ratio of speed reduction is variable to a considerable degree by changes in the connection of motors without changing the speed of the prime mover. Thus we can use one ratio of speed reduction for cruising conditions and another for high speed conditions and this makes possible a high efficiency in the turbines under both conditions. Efficiency at cruising speed gives increased cruising radius without dependence upon sources of fuel supply. The electric drive also gives an interchangeability which is valuable in a warship. A plurality of turbine units can be used for high speed conditions where the power is large and a single unit for low speed cruising where the power required may be not more than a tenth of the maximum.

"About the year 1909 our turbines had reached a state of development which led me to the very positive belief that with the advantages above mentioned the turbo-electric drive if properly designed and handled would afford a very valuable improvement in warships, and I began a campaign of promotion which went on for several years and which finally resulted in the adoption of the electric drive for all of the new larger battleships and cruisers which were authorized after its adoption was decided upon."

The first turbo-electric drive was installed on the U. S. Navy Collier Jupiter, built at Mare Island, California, and delivered in 1913. The first battleship so equipped was the New Mexico in 1917.

This 100th tanker at Swan Island is the first Maritime Commission tanker christened in honor of an individual and it is very fitting that she should be named W. L. R. Emmet for the man who, more than any other engineer, was responsible for the introduction of the electric drive for ships.

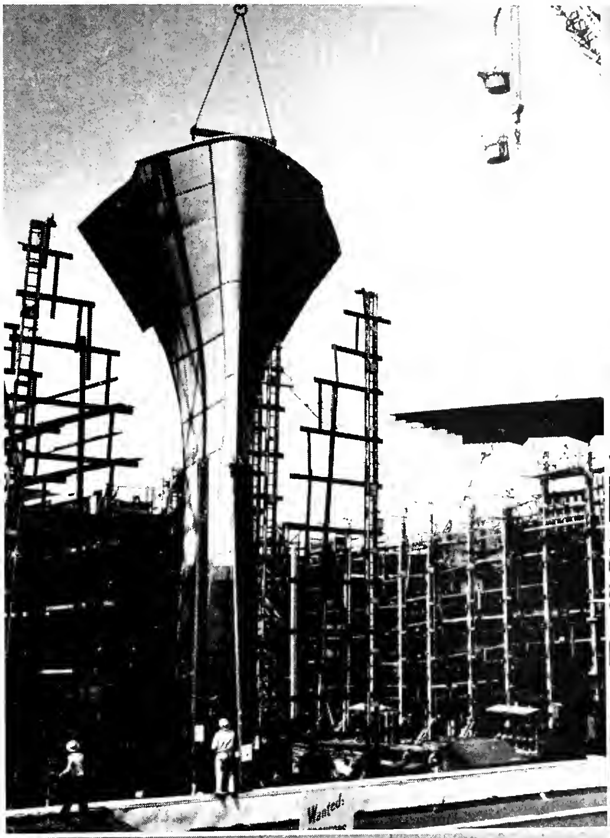
ON THE FACING PAGE:

Upper left: Fore peak section of 16,800-ton Swan Island tanker is lifted into place.

Upper right: 104-ton prefabricated mid-ship deck house is lifted while the signal man on the bow section in the background stands ready to direct the whirly operators as the section nears the ship.

Lower left: Forward pump room and coffer dams section weighing 78 tons about to be placed in the ways.

Lower right: The same forward pump room and coffer dam section almost lowered into place. Note fabrication details and piping and valves alread/ installed.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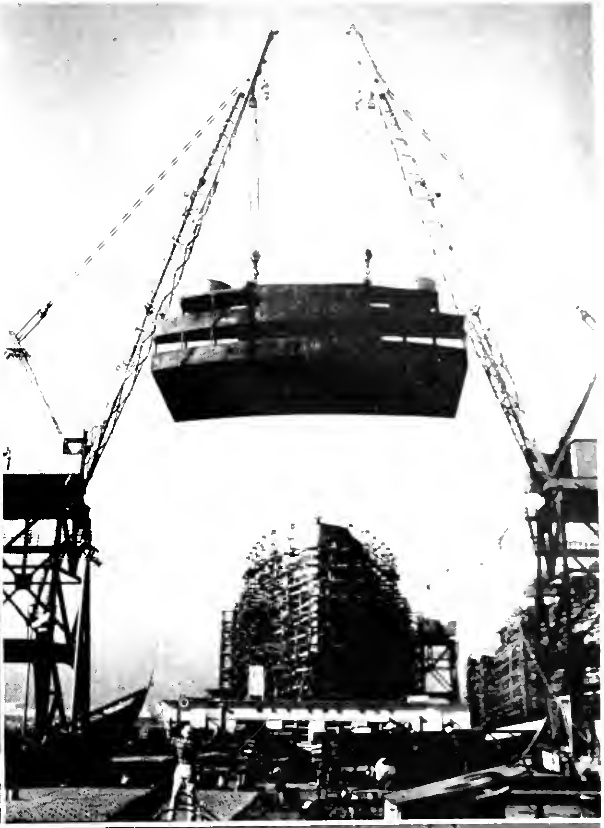
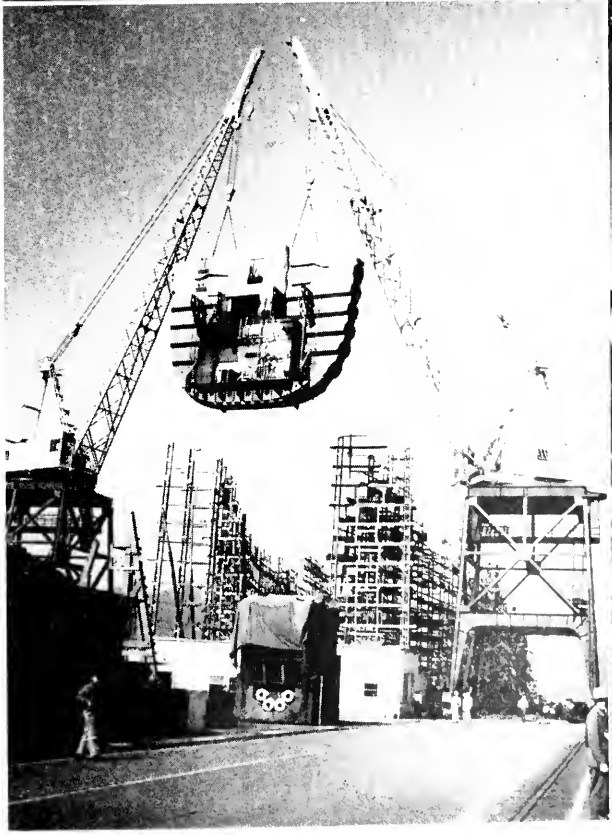
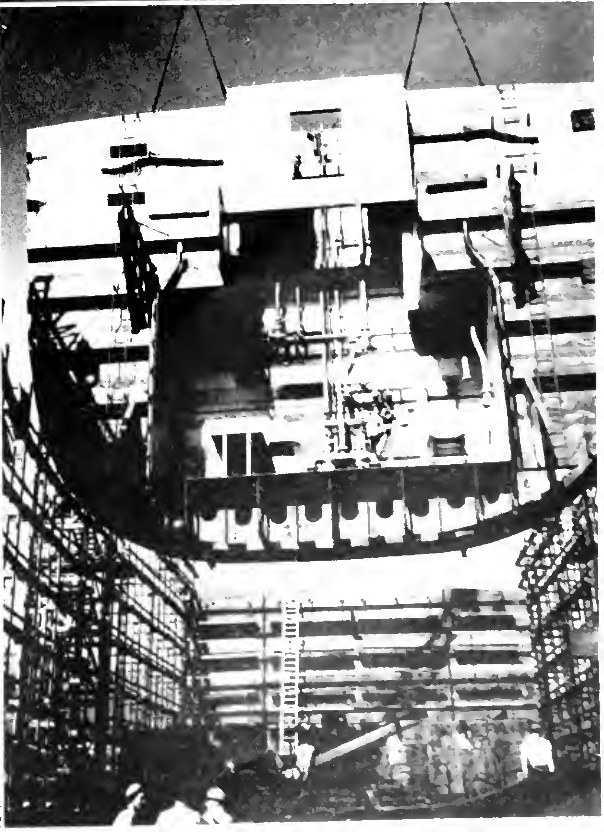






Maritime Conference for 1944

Post-War Shipping and Shipbuilding

The 18th annual meeting of the American Merchant Marine Conference was held in New York October 18-19-20 at the Waldorf-Astoria Hotel. Large and enthusiastic audiences gathered for the special panels and the general meetings and some very excellent papers were presented on the various programs.

Probably the subject most pressing in the minds of the steamship executives present was post-war planning for the American Merchant Marine. In these days this subject is always faced at the outset by almost impossible, or at least unpredictable, uncertainties, chief among these are: uncertainty as to air competition; uncertainty as to Federal policies; and uncertainty as to Army and Navy competition.

Four papers stand out as covering this phase of the conference; we present below extracts from the four. These papers are interesting because they convey the viewpoints of the shipping industry, the shipbuilding industry, the Federal shipbuilding and shipping control, and the American Bureau of Shipping.

It is noteworthy that these various viewpoints present no great differences in proposed solutions. There are differences of course but they are such as can be easily ironed out with the aid of a little common sense and tact.

The private shipping industry of America is faced with a tremendous opportunity to write in an acceptable post-war shipping plan. Unless the industry is able to achieve such a united front it will have imposed on it from Washington a plan that may be very unacceptable. National Federation of American Shipping was formed for the purpose of giving unified voice to the shipping industry. This voice should be crystalized and be broadcast to the nation.

In the following papers there is developed a trend of thought which should be impressed on the American public. It is best expressed in the slogans—Imports beget Exports—Buying helps Selling—More Overseas Trade keeps More Ships Busy.

Post-War Shipbuilding As It Should Be

H. GERRISH SMITH
President, Shipbuilders Council of America.

By H. GERRISH SMITH

President, Shipbuilders Council of America

At the end of the war, the United States probably will have 50,000,000 deadweight tons of merchant ships. The existence of this large fleet will inevitably curtail the demand for new ships for sometime in the future.

The prices at which ships will be sold to operators has not been determined. Bills concerning this matter have been before Congress for months. A special Congressional committee on Postwar Economic Policy and Planning, with a subcommittee dealing with foreign trade and shipping, is considering revisions of the Merchant Marine Act of 1936, and other matters important to the future of shipping. No report has yet been made by this sub-committee.

The Navy and the Army have taken over and have in operation most of the popular and efficient combination passenger and cargo vessels previously engaged in trade. No one knows when or whether these vessels will be released.

The right of the steamship owner to operate airplanes still is unsettled, and is an important factor controlling the type and design of ships needed by the operator.

The policy of the Government as to immigration will affect the type and the design of ships to be built.

Some of these problems undoubtedly will involve international consideration at the peace table.

It seems inevitable that the total needs of the military authorities to meet the requirements of a possible emergency will call for a large pool of ships over and above the demands for trade.

The Chairman of the Maritime Commission has stated his belief that we should have a total merchant fleet of from 15 to 20 million deadweight tons after the war to meet the demands of trade, and he has stated that we should carry approximately 50 per cent of our own exports and imports in our own ships.

From 1926 to 1941, the greatest gross tonnage of shipping engaged in our coast-wise trade at any time was 2,000,574 for general cargo service, 2,360,177 for tanker service and 521,250 for combination-passenger type of vessel. These totals fluctuated widely from year to year. A revival of this trade after the war is expected, but its volume will be controlled by many factors.

The extent of the participation by the United States since the first World War in its own foreign trade on the basis of value and tonnage is shown in the table herewith.

The maximum participation by American ships in foreign trade at any time between World War I and World War II, indicates that, under similar volumes of trade, with fifty per cent carriage in our own ships,

15,000,000 deadweight tons is about the maximum tonnage of our own ships that could be used under the most favorable conditions for both foreign and domestic trade. These figures do not include the Great Lakes or River tonnage.

It is my belief that this country will have great difficulty in maintaining the carriage of fifty per cent of its own exports and imports in its own ships. Exports from one nation are imports to other nations, and the buyer has the right in most cases to specify the routing. The answer to more ships in service is more world trade—more American foreign trade, with special emphasis on imports. There is no other answer to a larger tonnage of shipping in our foreign trade.

More trade must be found on sound financial and political considerations. Ship operators engaged in foreign trade, if given reasonable freedom and liberality in operation of their services, can do much to increase it.

There certainly will be a great demand for ships for the repatriation of our troops, for the return of war equipment, for the shipment of food and other supplies to liberated and other countries, and for the carriage of materials for the rebuilding of industries and buildings abroad which have been destroyed during the war. There also will be an inevitably heavy demand for American materials and equipment, all in addition to the normal trade requirements.

There will be an ample number of suitable ships available for most of these purposes. During the immediate post-war era the ship repairers should be very busy in both the repair and conversion of vessels. The probabilities of long term post-war needs, however, are more uncertain.

Notwithstanding the large fleet of merchant vessels that will be on hand when the war ends, many special types will be needed. This will involve much reconversion and some new construction.

Building for the Navy will depend wholly on the policy of Congress as to the size of the Navy to be retained, the replacement of over-age vessels, and the building of new vessels of experimental types.

Costs

Cost in this country, due to our higher wage scales, will continue to be much higher than abroad, so that an equalization of opportunity for American labor to engage in the building and operation of ships will continue the necessity for Government aid for operation in the foreign trade as provided for in the Merchant Marine Act of 1936.

An experienced technical staff and nucleus of skilled mechanics must be kept in continuous employment in peacetime, if they are to be available to meet the added burden placed on the industry in a time of national emergency.

The possibility of serious liquidation in the industry in the post-war era cannot be ignored. It is more than a mere industry problem—it is in essence a vital national problem, having a direct influence upon the peacetime security and economy of this nation. The future well-being and stability of both the shipbuilding and ship repairing industry, in the final analysis, therefore, should be a matter of grave public concern.

It is difficult to visualize the minimum employment in the industry that will maintain it in an efficient operation condition. Based on my own experience over a period of many years, I venture the assertion that an average permanent force of 150,000 men, operating in the private shipbuilding and ship repairing yards of the United States in peace time, is vital to the future security of the nation. Furthermore, there should be kept intact not only those facilities and equipment in going yards, but such additional facilities and equipment as will permit of rapid expansion in the event of another emergency.

GROWTH OF FOREIGN TRADE OF THE UNITED STATES SINCE 1920

(Values in Millions of Dollars)

CALENDAR YEAR	Waterborne Foreign Trade: Value Including Re-Exports (1-B)	Waterborne Foreign Trade: Volume Tons of 2240 Pounds (2)	Foreign Trade Carried In American Vessels: Value Including Re-Exports (1-B)	Foreign Trade Carried In American Vessels: Volume Tons of 2240 Pounds (2)	Carried in American Vessels, Percent of Waterborne Foreign Trade by Value (1-B)	Carried in American Vessels, Percent of Waterborne Foreign Trade by Volume (2)
1921	$6,800	81,824,834	$2,380	42,012,205	35.0	51.3
1922	6,779	87,183,756	2,383	44,783,045	35.1	51.4
1923	6,850	92,375,652	2,398	38,972,656	35.0	42.2
1924	7,155	93,160,418	2,544	40,609,591	35.6	43.6
1925	7,940	92,801,653	2,624	36,931,313	37.1	39.8
1926	7,941	112,825,756	2,596	33,227,235	32.7	34.0
1927	7,759	99,113,432	2,649	40,153,214	34.1	40.5
1928	7.827	106,224,826	2,605	43,474,755	33.7	40.8
1929	8,129	103,460,581	2,692	43,152,476	33.1	39.5
1930	5,803	97,293,286	2,014	39,736,158	34.7	40.8
1931	3,871	75.913,532	1,351	28,132,458	34.9	37.1
1932	2,549	60,554,846	907	21,471,388	35.6	35.5
1933	2,758	58,952,517	976	19.372,371	35.4	32.9
1934	3,283	67,634,964	1,186	22,202,230	36.1	32.8
1935	3,786	72,111,543	1,354	22,865,330	35.8	31.7

Great interest was shown in the Panel Discussion of "Future of American Shipyard Capacity," which was held in conjunction with the Eighteenth Annual Meeting of The Propeller Club of the United States and American Merchant Marine Conference at The Waldorf-Astoria from October 18 to 20. This discussion was presided over by Chairman C. W. Bryan, Jr., vice president, Federal Shipbuilding & Drydock Co.; and Co-chairman H. Gerrish Smith, President Shipbuilders Council of America.

Admiral Land and the representative of N.M.U. of A. at Labor Panel.

Opinions and Recommendations

By Vice Admiral Emory S. Land

This country should organize and build up a ship-breaking industry with one unit on the East Coast, one unit on the Gulf Coast, and one unit on the West Coast.

I do not believe in scrapping any of our war-time built fleet; that is, any of our new ships. I thoroughly believe in scrapping our obsolete ships of the decrepit age of 20 years or more—at least four million tons.

I thoroughly believe that any surplus of our war-built fleet that can not be economically used by us or sold to the Allied Nations should be put "in sanctuary" by statute and become "untouchable" except by revocation of the statute. They must not hang over the market!

It is my belief that we should sell some of our surplus shipping at what it would cost to build those ships in a foreign market. At this time I shall leave it up to you and to the Congress to determine whether or not we should sell any of our fast ships. Get busy! Register your ideas and vote your opinions now!

To touch very lightly on the labor problem, the suggestion is made that post-war, wherever practicable, we adopt an incentive system and, wherever practicable, we delete any feather-bed system.

Here are four free tips to you all:

(1) Improve your ports;
(2) Consider package freight;
(3) Improve stevedoring methods;
(4) Reduce handling costs.

There are a few simple rules that must be recognized if we are to develop a proper foreign trade:

(a) Trade barriers must be knocked down—not built up;
(b) Multilateral agreements should be sought and obtained—no bilateral;
(c) Remember, for every seller there must be a buyer;
(d) Imports are of almost as great importance as exports. Let's get over the silly idea that there is something not quite O.K. about imports;
(e) Long-term credits are bound to be necessary in the post-war era.

Vice Admiral Emory S. Land, U.S.N. (Ret.), Chairman of the United States Maritime Commission, was the speaker at the luncheon held in conjunction with the Eighteenth Annual Meeting of The Propeller Club of the United States. The luncheon was attended by over 1000 members and delegates.

Reading left to right: J. Lewis Luckenbach, Chairman of the American Merchant Marine Conference, and President, American Bureau of Shipping; Vice Admiral Emory S. Land, U.S.N. (Ret.), Chairman, United States Maritime Commission; John F. Gehan, President, Propeller Club, Port of New York, and Vice President, American Export Lines, Inc.; Arthur M. Tode, Honorary President, The Propeller Club of the United States.

Post-War Shipping Questions

By J. Lewis Luckenbach

Chairman, American Merchant Marine Council, and President, American Bureau of Shipping

The only forceful way to promote our merchant marine to the point we want to see it, is by the united effort of labor, shipbuilders, owners, suppliers, and everyone who has to do with our merchant shipping. Indi-

vidual group effort will get us nowhere; as one combined group it can be accomplished.

Sound plans must be immediately forthcoming for the establishment of our post-war merchant marine in the foreign trade. If we of the industry do not do it, we may find plans emanating from Washington that might not be to our liking.

In maintaining an adequate merchant marine, we must cooperate with friendly nations and see that any necessary curtailment of former maritime activities goes where it belongs.

The suave suasion of foreign diplomats will be brought to bear on our Government and if we are weak and listen—as we frequently have heretofore—we will find ourselves at the bottom of the ladder with so many rungs broken that we will not be able to climb. We want to be friendly; we should assume a fair policy but the Jack Spratt divisions after the last war are not to my liking. Let's have a little of both the fat and the lean. This is only one important phase. We owe our children and our children's children security. Americans have fought and died to bring about security for America. The best way that I have ever heard of being secure is to be prepared for any eventuality.

Wars have been in fashion since the world began and there has never been a time when a war of some nature has not been going on in some part of this world. Nations of people are so constituted and cannot and will not change. Down in our hearts we all know this. We wish for a lasting peace. We have fought wars to end all wars but unless the people that constitute the various countries can be miraculously changed and the word "greed" taken from dictionaries as obsolete, we cannot hope for that ultimate blessing.

The best insurance that we can purchase for the protection of the future of our country and its people is the maintenance of an adequate defense and the best defense is a good offense. We should and must have a larger army than heretofore—a large Navy and the accoutrements that go with these—and a sufficiently available merchant marine to serve as an auxiliary to these forces, to transport the huge amount of supplies and troops necessary if we become involved.

Several hundred attended the Panel Meeting on "Labor," which was held in conjunction with the Eighteenth Annual Meeting of The Propeller Club of the United States, and American Merchant Marine Conference, October 18th, 19th and 20th, 1944, at The Waldorf-Astoria. This meeting was presided over by Chairman Frank J. Taylor, President, American Merchant Marine Institute, Inc.; and Co-chairman Robet G. Howlett, Member, Shipbuilding Commission of the National War Labor Board.

Outlook For Private Shipping

By Almon E. Roth

President, National Federation of American Shipping, Inc.

It is obvious that our principal, and possibly our sole advantage (in post-war shipping), lies in the fact that we will have the world's largest merchant marine fleet when hostilities end.

Our advantage with respect to available tonnage is subject to the following qualifications:

1. There is no assurance that we shall have a surplus, or even a sufficient number of fast and economical ships of the "C" and "Victory" types available for private operation. It is generally conceded that the Liberties, of which we will have approximately 2300 ships, are not adapted to the requirements of most types of both foreign and domestic service.
2. We shall be at great disadvantage so far as passenger tonnage is concerned. Many of our best passenger liners have been lost during the war, and others have been so radically converted for war purposes that there is little likelihood of their reconversion for passenger service. In some cases it has been estimated that the cost of reconversion would approximate the cost of new construction.
3. In view of the avowed plans of our foreign competitors to re-establish their fleets with modern, specialized vessels as early as possible, the advantage which we will enjoy on account of our existing American tonnage, at best, will be a temporary one

In the last analysis, the ability of this nation to operate and maintain a sound and adequate American merchant marine, will depend upon the ability of American shipping companies to render services at reasonable costs, in competition with foreign steamship lines and other forms of domestic transportation. Such service must be rendered on a basis which will provide reasonable operating profits and permit the replacement and modernization of American merchant ships

It is important for us to give at

(Page 115, please)

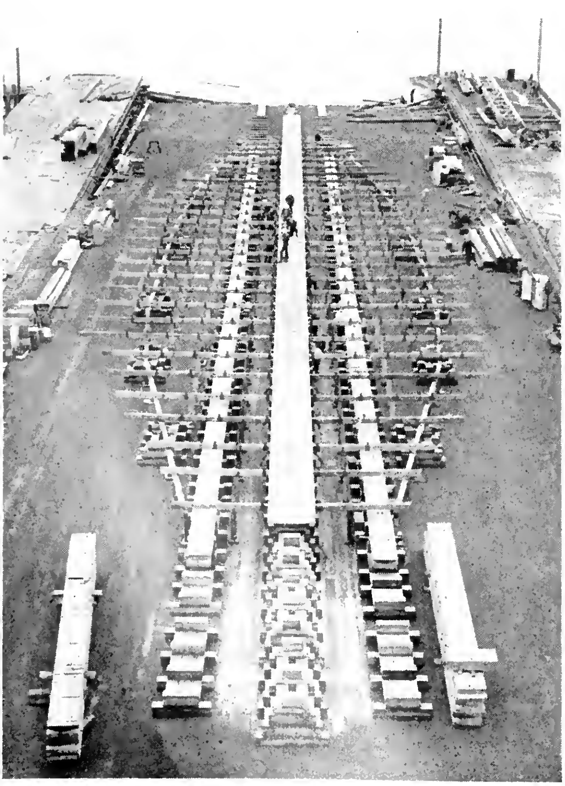
The finished product ready for sea.

Ships and Men

by Monroe Jackson

When World War II has ceased to be the grim business of kill and destroy and the historian, statistician, and biographer bring the true facts and figures to light, one word will stand out above all others. That word is "Ships," or we might more correctly say, "Ships and Men."

America became part of the known world because of man's quest of far horizons in ships. The evolution of ships from the crude dugout hewn from a tree to the modern vessels of steel is a graphic picture of man's quest for a better, safe, and faster means of transportation.



The "keel" or start of a Liberty vessel.

Countries of the old world—England, France, Germany, and Italy—never lost sight of the importance of ships. These countries long ago established trade routes to other continents and islands of the South Pacific, which served a two-fold purpose; first, an outlet for goods which they could manufacture in excess of home consumption, and secondly, a source of supply for materials and commodities which were not obtainable or in sufficient quantities for their needs.

This was not the case in America. Nature had endowed this great country of ours with minerals and petroleum products, unlimited timber resources, our boundaries embrace climatic conditions favorable to all types of foods, grains, and fruits. In short, we felt smug and self-contained.

We were due for a rude awakening when the Kaiser and his German hordes set Europe on fire in 1914. Ships played the all important part of carrying food and ammunition to England, France, and Belgium; and later when America entered upon the side of right when France and England were both groggy holding back the German hordes, ships became the most vital need of the hour.

America had a small Navy and a smaller Merchant Marine. England, the world's number one sea power, and France had lost ships to Germany's submarine warfare, and were being sorely tried to maintain the short supply routes from England to western and southern ports of France.

America was awakening. Large supplies of munitions and food were piling up in our eastern seaports, supplies that were vitally needed in Europe. Once again ships was the cry, and our shipyards along the eastern seaboard made frantic efforts to build ships in the shortest space of time.

This country built a million and a half tons of shipping for a world's record; and history records how American guns with Yanks behind them broke the vaunted Hindenburg line and the English Navy augmented by American Naval Units broke the back of the submarine menace; and on November 11, 1918, the world started to what was hoped would be peace and security for all nations to live in accord with one another.

America, setting an example for all nations to follow, actually cut up

battleships and cruisers upon which millions had been spent in their construction and allowed shipyards to close and grow up in weeds.

From the close of World War I, shipbuilding gradually became a lost art. Only the old line shipyards on the eastern seaboard were building a few tankers for private operation and replacements of obsolete Navy vessels were built from time to time.

Shortly after 1930 the Nation's leader and a few far-sighted men with enough courage of their convictions to openly advocate a large Navy with an adequate Merchant Marine to service and supply its needs were heard, but it was a man-sized job to sell this idea to the country as a whole. But patience and persistence have their rewards, for in June, 1936, by an Act of Cngress, the United States Maritime Commission was created.

This was the first step forward. Ideas became actual designs of the drafting table, and American shipbuilding was on the way to take its rightful place among the Nation's industries.

The Commission worked up three standard designs of Cargo Vessels known as C1, C2, and C3 designs, and in addition, the largest non-combatant vessel ever constructed in American shipyards, the S. S. America.

The contract for the construction of the America was signed October 21, 1937. This was slightly over a year after the creation of the U. S. Maritime Commission and was awarded to the Newport News Shipbuilding and Drydock Company of Newport News, Virginia. The keel for the America was laid August 22, 1938, launched August 31, 1939 (1 year and 7 days elapsed time), and delivered July 2, 1940 (10 months and 2 days later), a total construction time of 20 months and 9 days. Not so bad when we consider this vessel was 723′ length overall, 93′ 3″ beam, 32′ 6″ draft loaded, lightship displacement approximately 17,229 tons, loaded displacement 35,440 tons, deadweight tonnage 14,331 tons. At a cruising speed of 22 knots, this vessel can operate for 20 days, traveling 616 miles per day, or about 11,000 miles round trip. This vessel was designed to carry 1845 passengers and crew, divided as follows: Cabin passengers 543, tourist passengers 418, third class passengers 241, crew of 643.

Some of the interesting sidelights of this queen of American merchant ships are as follows: The propulsion turbines, of which there are two, deliver 34,000 shaft horsepower to the propellers turning at 128 r.p.m The vessel is equipped with four 600 k.w. steam-driven generators, which require 158 miles of cable to distribute the power and lighting to all parts of the ship. The America on her official trials developed 42,850 shaft horsepower and a top speed of 25.3 knots. All in all, she was quite a ship, and as you are all aware, at the outbreak of the war all of the fine paintings, murals, and costly fittings and furniture were removed, and she was fitted out as a transport and renamed the West Point. History will record the great work she has performed in getting our men and supplies overseas.

As stated before, the Commission brought forth three standard designs of Cargo Vessels, the C1, C2, and C3, whose main characteristics are:

The C1B Cargo Vessel is a design of 417′ 9″ overall length, 60′ beam, 27′ 7⅜″ draft load, lightship displacement of 3828 tons, loaded displacement of 12,875 tons, deadweight tonnage of 9047. This vessel was built with Diesel engine power in some shipyards and with the conventional steam turbine power in others. At a cruising speed based on 14.5 knots as the most economical speed, this vessel, consuming approximately 155 barrels of fuel oil per 24-hour day, can operate for 84 days traveling 348 miles a day, or about 29,000 miles round trip. They can be stepped up to a speed of 16 knots for maximum performance.

The C2 Cargo Vessel is a design of 459′ 2½″ overall length, 63′ beam, 25′ 9″ draft loaded, lightship displacement 5320, loaded displacement of 13,860, deadweight tonnage 8540. This vessel was also built with Diesel engine power in some shipyards as well as the conventional steam turbine power. At a cruising speed based on 15.5 knots as the most economical speed, this vessel consumes approximately 240 barrels of fuel oil per 24 hour day and can operate for 47 days, traveling 372 miles a day, or about 17,484 miles round trip. This vessel can be stepped up to a maximum speed of 17 knots.

The third and last of the original "C" or standard design is the C3 Cargo Vessel. This vessel is 492′ overall length, 69′ 6″ beam, 28′ 6⅞″ draft loaded. This vessel has been built with only turbine propulsion to date. At a cruising speed of 16.5 knots, this vessel consumes approximately 320 barrels of oil per 24-hour day, can operate for 57 days, traveling 396 miles a day or about 22,500 round trip.

In addition to the above mentioned designs, the Maritime Commission brought forth a design of a tanker with all machinery aft and bridge and quarters amidship. This vessel is 533′ length overall, 75′ beam, 18,230 tons deadweight, and was designed for a cruising speed of 18 knots and a maximum speed of 19.5 knots. These tankers have an oil-carrying capacity of 150,000 barrels or 6,300,000 gallons.

With the above four designs, the Commission started with their proposed 10-year program of ten ships a year; and MC Hulls 1 to 50 were allocated to such old line yards as Sun, Federal, Bethlehem Steel, Newport News, and two shipyards in the Gulf.

It was not until January 25, 1939, the West Coast came into the picture when Moore Dry Dock Company of Oakland, California, signed a contract for Maritime Commission Hulls 51 and 52, which were of the C3 design.

Consolidated Steel Corporation (Craig Yard), Long Beach, California, next received a contract on September 6, 1939, for four C1 design steam-propelled vessels. This was followed closely by an award to Bethlehem Shipbuilding Corporation (Union Plant), San Francisco, for five C1 steam propelled vessels

These were closely followed by the award of a contract on October 20, 1939, to Western Pipe and Steel Corporation located at South San Francisco for five C1 design diesel driven vessels, and lastly, Seattle Tacoma of Todds located at Tacoma, Washington, were awarded a contract for five C1 design, also diesel driven vessels

Thus, at the beginning of the year 1941 the Pacific Coast was definitely a part of the shipbuilding industry.

The cry for ships and more ships was rapidly being heard over the world, for once again the warlords were loose in Europe and the mad paperhanger's hordes were spreading death and destruction over the land

America, while not actually at war, could see the handwriting on the wall, and a job that was sup

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Pacific WORLD TRADE

By T. Douglas MacMullen

Alcoa's Program for Trade Development

By W. C. WHITE

W. C. WHITE
Vice President, Alcoa S. S. Co., Inc.

Note: This is the first of a series of articles by important steamship company executives on the future of World Trade. They are calculated to be helpful to industry in developing foreign markets and in their suggestiveness to other companies in taking similar promotional steps in the interest of importers and exporters in the fields in which they operate.—Ed.

Mr. White, Vice President, Alcoa Steamship Company, is a former advertising man and is unusually well qualified to discuss sales promotion for shipping services. In the following excerpts from an address before the Sales Executives Club of New York in September, he describes Alcoa's efforts to interest and assist American manufacturers in postwar sales abroad.

Today we are in the process of learning, and at a bitter price, that America can no longer maintain an isolationist policy in the conduct of the world's affairs. If we are to find peacetime employment for the millions of men in our army and our navy, we must realize that this is as true commercially as it is politically.

The Challenge of World Markets

The challenge to American industry, and that means to American sales managers, will be to create markets capable of absorbing the results of a higher rate of production than we have ever before reached in peacetime. There is only one answer—world markets—a return to the commercial ventures which were such a commonplace to our ancestors.

It is often said that the fifteen percent of our production which formed our prewar export volume was the difference between profit and loss for many manufacturers. I do not know whether this is just good promotional talk on the part of steamship operators, or the truth. I haven't even tried to find out. We know that we must have maximum production in this country after the war. We know that we cannot maintain it over any period of years if we confine our selling efforts to this country. But if we are going to sell throughout the many countries of the world, we must look at these countries with the same commercially analytical eye with which we have studied the cities and counties in this country. We must look for those countries which are growing and which will develop in the next century in the same way we have developed in the last hundred years.

American industry is peculiarly well adapted for supplying the types of equipment needed by expanding economics. Because of our huge domestic market we have had more experience in producing a greater variety of producer and consumer goods than any other country in the world. We are in a position to help others, as well as ourselves, without fear of any loss of future markets in this country as a result of the industrialization of other countries. The truth is, of course, that **industrialization automatically raises the standards of living and that this country is always benefited by an increase in the living standards of other people.** For the higher their living standards, the greater is their demand for those products of our own factories and farms which we here are able to produce more efficiently, and in better quality, than anyone else. The history of international trade shows that it pays an economically strong nation to help its neighbors develop.

Opportunities in Russia, China, South America

I have told you that I am only a freshman in the steamship business. I am less than that as an export market specialist. But as a salesman who has had a little different experience during the last two years from that of the average salesman, I recommend to you a study of Russia, China, and the countries of South America as examples of areas in this world which are today friendly toward America—which have expanding economies and—which have as yet unmeasured possibilities for finished American goods of many kinds.

Sumner Welles wrote a book recently which he called "Time for Decision," and which ought to be must reading for every sales executive today. Mr. Welles sums up all that there is time to say about Russia today with the following:

"The needs of Russia in the immediate post-war period for credits, for expert services, and for machinery and equipment of many kinds will be great. At the same time, the commercial opportunities which such a situation will offer to American enterprise and to American export trade are almost unlimited."

Recently I have become acquainted with several Chinese who are close to the present Chinese Government. Their knowledge of their country is exact. Their conversation is as practical and factual as the Chinese people are reported to be. All of them have said in their own way, "I doubt if you in America know the extent of our country as a market, or the extent of our feeling of friendship for the United States, and our preference for dealing with your people."

As for the Caribbean area and those parts of South America which we serve, I have seen the backed-up demand for American goods there with my own eyes. During the last two years, I have been in Haiti, Dominican Republic, Trinidad, British Guiana, Surinam (which we used to call Dutch Guiana), and Venezuela—not once but three different times.

I have talked with presidents, governors, importers, merchants, plantation owners, oil company representatives, and the man on the street wherever I could find him. I had no trouble getting acquainted. I had no trouble making myself understood whether it was in a country where Dutch, or French, or Spanish is the language.

They all told me the same story. They have money to spend. They have everyday needs and wants to fill. They have been unable to spend the money or fill the needs because W.S.A. has not had the ships to allocate to that area . . . and those which we have operated in the bauxite trade have been unable to carry a full load southbound because there was not time at this end to load them. We had to have the shortest possible turn-around and that meant only the barest necessities for the Caribbean area.

It was our knowledge of these conditions which led us to our present advertising and promotional program.

The Alcoa Steamship Company, although organized by the Aluminum Company of America to bring bauxite, the ore from which aluminum is made, from Surinam to the United States, actually operates as a common carrier and as such serves the whole eastern part of the Caribbean. When war broke out, we owned twenty-six American flag ships. They were general cargo vessels which carried south all manner of goods for American exporters.

Before the war, there was a growing movement of American merchandise to this area in which we as a common carrier shared.

From 1929 to 1939 the percentage of imports into the Caribbean countries which came from the United States varied from thirty-three to fifty per cent. That area was not our largest export customer but we were at all times their largest supplier.

Looking toward the future we could see that those countries were certain to become even better customers of American manufacturers and exporters if they were cultivated by American firms. That meant an increased tonnage of southbound freight and more business for the Alcoa Steamship Company. We had a purely selfish interest in helping both the prospective American shipper and our friends to the South.

You can sometimes fool an engineer, and occasionally a banker, but you can never fool a sales manager—well hardly ever. I will say to you frankly that we believe in a good neighbor policy but this program of ours is an ordinary commercial attempt to help American manufacturers find a greater market for their

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United States Tariff Reductions and British-American Trade

What part has the tariff on imports played in creating the persistently favorable balance of payments of the United States during the inter-war years and therefore that scarcity of dollars which led to the accumulation of gold by the United States, to world deflation and to the crisis of 1931?

How far could a reduction in these tariffs solve the prospective scarcity of dollars after this war?

These questions have been keenly debated and are bound to be increasingly asked as the United Nations, if successful in settling the main outlines of the world currency set-up, turn to the more fundamental task of framing the commercial relations which that monetary system is designed to serve.

This is how the direct trade between the United States and the United Kingdom flowed in 1928, 1935 and 1938, first as seen from the United States:

	In Million $		
	Imports	*Exports*	*Surplus*
1928	349	848	499
1935	155	433	278
1938	118	521	403

And now as seen from the United Kingdom:

	In Million $		
	Imports	*Exports*	*Deficit*
1928	918	336	582
1935	432	148	284
1938	578	141	437

(The two sets of figures do not exactly agree, though they pretend to tell the same story. There are differences in methods of valuation, variations due to inclusion or exclusion of freight and other transit costs and finally differences of timing. Nevertheless, the conclusion is the same in each case—an exceptionally large balance in favor of the United States.)

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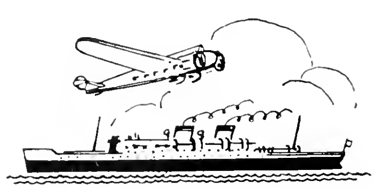
The League of Nations experts have no hesitation in saddling the United States tariff with some responsibility for the fall in imports of manufactures from Europe:

"The considerable discrepancy between imports and exports must . . . be attributed largely to the high United States tariffs which have prevented many European manufactures —particularly non-durable consumers' goods into the manufacture of which much labor has entered—from competing successfully on the United States market."

This is how the merchandise trade



of the United States in 1938 was distributed:

	In Million $			
	Imports	*Exports*	*Surplus*	*Deficit*
With United Kingdom and Eire	120	548	428	
With rest of Europe and U. S. S. R.	466	791	325	
With Asia	550	503	......	47
With Africa	55	118	63	
With Latin America	485	564	79	
With other N. America	268	476	208	
With Oceania	16	94	78	
	1,960	3,094	1,181	47

This table shows a grossly "over-exported" or, rather, "under-imported" position, especially for a world creditor country.

The distortion is at its greatest relatively and absolutely in the trade with Great Britain, Australia and New Zealand. The position is eased —but only slightly—by import surpluses from the tropical countries of Asia and of Latin America (the latter are swamped in the above table by export surpluses to non-tropical South American countries).

Multilateral Trade Essential

Though the position as a whole is unbalanced, it is evident from these figures of the distribution and character of the United States merchandise trade that equilibrium can only be approached in a multilateral system of trade. The set-up of United States economy, and indeed that of Great Britain, would make it impossible to get bilateral equilibrium, save at the expense of a drastic contraction of the trade done between them.

This will appear more clearly if some analysis be made of the main items of the United Kingdom exports to the United States and of the Trade Agreement of November, 1938, which governs the trade between the two countries.

The United States administration, under the Tariff Act of 1930, has power to reduce duties by 50 per cent. Under the Reciprocal Trade Agreements Act of 1934 it has power to reduce them by a further 50 per cent. The Attorney General has ruled that these powers are cumulative. In other words, it would be possible, by going the limit, for the United States to reduce tariffs to 25 per cent of the rates imposed in 1930.

The appropriate section of the Tariff Act of 1930 is Section 336, and is entitled "Equalization of Costs of Production." It has been used much more frequently to raise than to lower duties. In effect, therefore, the practical existing limit of tariff concession is the 50 per cent figure of the Reciprocal Trade Agreements Act.

The Agreement with the United Kingdom signed on November 17th, 1938, granted two types of concession to British imports into the United States. It reduced duties on goods, the United Kingdom-United States trade in which amounted to $59,900,000 in 1937. It "bound" the duties, i. e., guaranteed there would be no increases, on goods which entered the United States from the United Kingdom to the amount of $81,600,000 in 1937. Of the last fig-

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ure, \$39,000,000 paid duty and \$42,600,000 were duty free. In some cases the reduction in duty amounted to 50 per cent, but they were few and affected a small volume of trade.

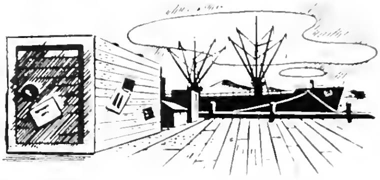
The main categories of British exports to the United States are whisky, cotton goods, flax, linen and jute manufactures, woolen cloth and apparel and leather goods.

Throughout its analysis of the foreign trade of the United States in relation to the tariff, the Tariff Commission of 1923 becomes almost monotonous in its reiteration that the goods imported from the United Kingdom are quality goods commanding a market which depends more on their prestige than on their price and, by implication, that the volume of their imports into the United States is therefore much more likely to be affected by the degree of prosperity and purchasing power of the United States than by any changes in the duties on them.

A study of this report, of the Trade Agreement of 1938, and of the recent distribution of United States merchandise trade, must convince one that in any attempt to restrict the direct trade between the United Kingdom and the United States within the framework of rigid equilibrium, one would have to contract the larger side to the smaller. In other words, to arrange this trade on strictly bilateral lines would mean limiting United Kingdom imports from the United States to the amount of goods which the United States imported from the United Kingdom. Any suggestion that this should be done is a counsel of despair. Britain speaks for a wider economy than that contained in this island. Despite its loss of overseas investments, it will, at the end of the war, still possess considerable overseas assets and it will continue to earn income abroad from its banking, insurance and merchanting services. This invisible income may, as in the past, be earned in many countries with which the United Kingdom will have a favorable balance of merchandise trade.

The United States economy will, at the end of the war, be more than ever geared to exports—the effect of war and of Lend-Lease will have seen to that. Moreover, the wartime stimulus to industrial development in the two countries will have followed somewhat similar lines. The war, in other words, will have had the effect of making the United Kingdom and the United States economies more similar and not more complementary. There will be an outlet for British goods in the United States, but they will not be "standard brands." They will, as in recent pre-war years, be the specialized high-quality, prestige goods, such as whisky, high quality worsteds, fine linen manufactures, high quality leather goods. All of these tend to sell irrespective of price. Indeed, in certain cases the higher the price the greater the attraction in the United States; in fact it is one of the conditions on which they sell. Their market in the United States, in other words, depends on one thing: prosperity.

Everything will, of course, continue to be done to obtain further United States tariff reductions. But even if such concessions were to treble the volume of United Kingdom 1938 exports to the United



States, this would not, on the basis of direct trade in that year, balance the payments between the two countries. Tariff concessions will help: they might gain for Great Britain useful additional outlets for such goods as ceramics, pottery and bicycles—but it should not be overlooked that in most of the standard things Britain manufactures well, such as iron and steel, engineering products, textiles, the United States are at least as favorably placed as British manufacturers and have at their command the economies of large scale production based on a much vaster domestic market.

To balance the British payments with the United States, multilateral trade must come to the rescue. The United States must buy more tea and jute from India, more rubber and tin from Malaya, more diamonds from South and West Africa. And Britain, must, in its turn, export to those countries and acquire from them the dollars they earn in their trade with the United States.

Above all, a solution of this problem of balancing international and particularly United Kingdom payments with the United States lies in the maintenance of a prosperous America. This will not merely lead to larger imports into the United States from the tropical countries of the sterling area, but it will greatly expand the American market for the specialties and luxury articles, which the United Kingdom is best fitted to supply. That seems to be the conclusion of the United States Department of Commerce, which, in its report on the United States in the World Economy concludes that "it seems clear that the wide fluctuations in domestic economic activity and world prices were of much greater consequence in determining the behavior of imports during the interwar period than were upward or downward revisions of the tariff."

Commerce Department Expanding Facilities

At the recent Foreign Trade Convention in New York, Amos E. Taylor, Director, Bureau of Foreign and Domestic Commerce, outlined certain of his plans for large scale post-war trade promotion.

The bureau is cooperating closely with the Department of State on a broad program to reinstate certain important types of reporting that have been severely curbed or completely blacked out during the war. These will include market surveys which will cover pertinent factors affecting sales, trade prospects, channels of distribution, specific business leads, foreign and domestic competition, transportation facilities, credit and exchange, and economic conditions.

The agency service will be brought up to date to provide experienced foreign traders with the names of interested prospects to act as their foreign representatives. Plans are also well under way to again publish trade opportunities in Foreign Commerce Weekly. As of old, they will provide leads on selling, buying and handling goods.

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Packing for Overseas Shipment

Protection Is Better Than Claims

There are losses at sea that are not caused by submarines.

Containers used for export shipment and the methods used for moisture proofing and otherwise protecting shipments by sea have in the past been given too little attention by many shippers. Many firms have special boxes and other containers designed for their overseas trade, and some even have engineers devoting all of their time to improving their packing methods. But many others do not.

Some foreign consignees have certain packing requirements that must be met. Sometimes they have ideas as to the unit package, some goods must be packed for ready inspection, some items require instructions for use in one or more foreign languages, or in a particular scale of measurement. The exporter who thinks that there is no way of doing things that is quite as good as his way may have claims to contend with or even refusal of the shipment at destination. If the habit of disregarding packing instructions is persisted in, there is even a possibility of difficulty in clearing his drafts at the bank, for packing—proper packing—is a requirement.

The wise export manager, or traffic manager, will go to every necessary length in ascertaining the hazards of the voyage. Packing that is adequate for a transcontinental haul may be just that and nothing more. There may be six or eight thousand miles still ahead for that package and the hazards that will beset it should be thoroughly understood.

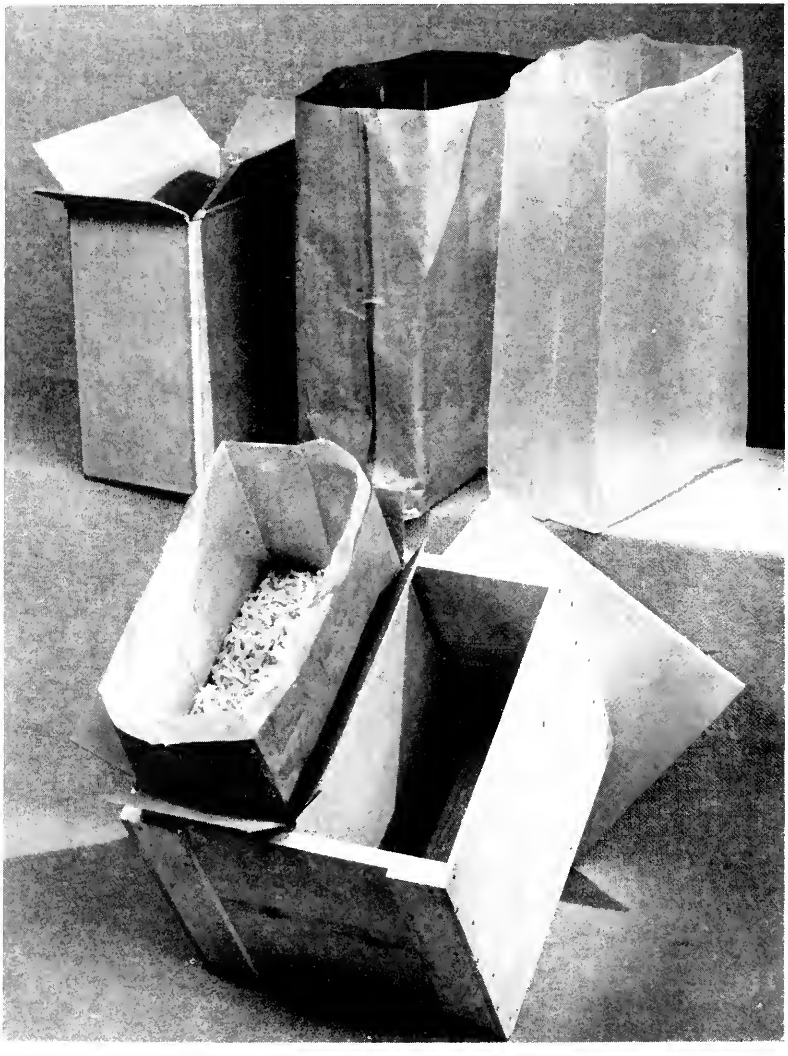
Probably the first hazard to be protected against is that of improper stowage in the ship's hold. The outer container must be sturdy enough to withstand the weight of other goods above it, as well as the side-play caused by the rolling of the vessel. This does not refer to possible loose bracing of the cargo, but rather to the interior actions of the contents of a case, or barrel.

The next hazard is that of ships' vibration and it is often such that interior packages burst open, and box fastenings break.

The next hazard is that of dampness, resulting in the deterioration, or destruction of the contents of a shipment or else resulting in rust or corrosion.

Still another hazard is that of temperature variations. Living in a temperate climate the shipper may have little or no realization of what happens when his goods pass through

The complete package for overseas shipping of food products in bulk. At top, at right is the inner bag made of two laminated sheets of glassine, coated with an inner layer of thermosplastic material for heat-sealing. Next is a Reynolds Metals Company sheet composed of dense kraft paper, asphaltic compound, solid sheet alloyed lead, moisture-proof adhesives, cellophane and a special heat-sealing coating—all laminated together. At the top, left, is one of the two solid fibre containers, into which the foregoing bags are placed when filled. Two of these comprise the contents of the specially designed wooden containers. Dehydrated potatoes are shown. Zellerbach supplied the assembly with the exception of the wooden shipping case which was furnished by Bay Cities Box Company. Before shipment, the wooden case is wire-strapped at two ends.



Pacific World Trade

This is the "A" end of Giant refrigerator car used in loading of kegs, barrels and cartons—four 1-gallon glass-pack of beverage base flavors. The car is scheduled to stop in transit to partially unload at Dallas and Kansas City, destined Chicago. The picture shows the method devised by Mission Dry in loading mixed carloads. The destination block has just been set up. Thirty-gallon barrels are on the floor, with 15-gallon kegs decked, and the cartons are two high in the far end and one high in the front. 1" x 6"s are used for flooring; and for facing to the cartons. The facing is nailed onto a 2" x 4", which is used for a cross-car brace, attached to the car walls, with 2" x 4" pocket cleats.

the tropics or extreme cold. A product that might properly be put up in ordinary packages for domestic distribution would perhaps require a glass or metal container, or even refrigeration for overeas delivery.

Wartime Experience

That domestic shippers had little realization of the importance of special packing for export is indicated by what happened in the early days of the war.

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When the Armed Forces [illegible] up the losses in early overseas shipments caused by improper and careless packaging, the amount was a staggering figure. According to an article in a recent issue of the magazine "[illegible] Packaging" the losses totaled as much as 70 per cent in some instances, and the wonder was that anything at all got to its destination in first class and usable condition. This was particularly true of shipments to the South Pacific where landing facilities are practically non-existent and the elements combined to nullify the effect of customary good packaging procedure. Although food shipments suffered greatly, the greatest losses occurred in ordnance, automotive parts, tools, and other precision made equipment that suffers most and quickest from exposure. Breakage also was very high.

Prompt recognition of the importance of the problem resulted in the Army, Navy and Marine Corps programs for study, and training of shipping and packaging personnel. Packaging manuals were prepared and distributed widely among manufacturers, service depots and forwarding organizations, and finally in the turning over of much of the exportable materials to professional packing organizations. One such organization in the San Francisco Bay Area has a staff of three hundred, or more, trained packers who undertake to

Sections of war packaging division of Moist-R Proof Container Co., San Francisco.

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protect the smallest mechanical parts by oiling or greasing or otherwise covering them, and then packing in proper containers. One plant reports handling thousands of separate items of all sizes, weights and shapes varying from four ounces to fourteen thousand pounds each.

Post-War

The extent to which this type of activity will be made use of by shippers in normal commercial traffic cannot be foretold, but it is a subject of tremendous importance to shippers, carriers, consignees and insurance people. No amount of freight claims will stock a store.

Loss and Damage Claims

There is no estimate of the amount of losses sustained in the period of the war due to improper packing; nor are the totals for the prewar period complete. Some guide as to the importance of the matter may be found in a report to a recent meeting of the Pacific Coast Transportation Advisory Board relating to railroad traffic within their territory, the statement was made that freight claim **payments** for the twelve months ending March 1st, totaled $46,096,945 and it was estimated that claims for the year 1944 would exceed $50,000,000. With perfect packing and shipping procedure there would be few claims.

The above figures do not include similar losses in highway carrier traffic; nor do they have any relationship at all to steamer traffic beyond the ports. Fifty million dollars is real money, but it is money only and does not replace the fifty million or so of man-hours of labor that went for nothing. Proper packing, even for domestic traffic, is big business.

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Packages suitable for jellies and various other semi-liquid products.

Dr. Pieter H. W. Sitsen, Commissioner Netherlands East Indies Division of Public Works and Reconstruction for the Indies. (Photo courtesy Netherlands Information Bureau.)

Dutch Indies Rehabilitation Program Under Way

A two billion four hundred million dollar relief, rehabilitation and reconstruction program for the Dutch East Indies, extending over a period of five years, is in concrete form and actually in operation, according to Dr. Pieter H. W. Sitsen, Netherlands Commissioner and director of public works and reconstruction for the Indies.

The plan involves three parts: (1) Relief — requiring food, medicines, clothing; (2) Rehabilitation— calling for replacements of worn-out farm implements, fishing equipment, repairs on transportation and communication, and stressing social needs with the view to placing the inhabitants on a self-sufficiency basis; (3) Reconstruction — requiring replacements of industrial machinery and the like.

The first two phases of the program will be paid for in cash by the Netherlands Indies government; the third part will probably be financed through loans, which will be repaid within two years.

In order to facilitate the plan, the Indies have been divided into 77 sections, according to type of land and its inhabitants, and each section has been made a separate project. It is

functioning in New Guinea now, where the first phase of the program is passing into the second phase of rehabilitation. He said at Hollandia and Biak the people are now beginning to live from their own productivity.

The first phases of the plan are being carried out by the Netherlands Indies Civil Affairs Commission as a part of the military under General MacArthur. Dr. Sitsen said that about $800,000,000 of the entire program would probably be spent in the United States, much of it from the West, specifically naming processed foods and hand tools.

The Netherlands Indies official, a military and civil engineer by training, has spent 37 years in the Indies. Prior to the Japanese invasion, he was chief of the Industrial Service of the Indies government.

Dr. P. Honig of the Board for the Netherlands East Indies, Curacao and Surinam, New York City. (Photo courtesy Netherlands Information Bureau.)

Dutch Officials Awake To the Future

That other countries are very much alive to the awakening prospects for trade developments in the South Pacific is indicated by the number of top trade experts who are passing through San Francisco en route to the Far East.

Dr. Pieter Honig, member of the Board for the Netherlands Indies, Curacao, and Surinam in the U. S., and director of the Netherlands East Indies Rubber Institute, is the third Dutch official to leave within a few weeks. French and British officials have also passed through and been interviewed. Dr. Honig, an expert on every phase of commercial and industrial developments in the Indies, expects rubber shipping to begin within three months after the islands have been liberated and believes that there will be no diminution of the demand for pure rubber throughout the world. He believes that synthetic rubber has a permanent place in the industrial picture regardless of relative costs because it is more suitable for many purposes than pure rubber. Furthermore, the very existence of the synthetic supply will hold prices in line and minimize the effect of any restored controls over the supply of the natural product.

The opportunities for other exportable products of the Indies will be greater than before the war. Health conditions throughout most of the world will require an increased supply of quinine in either the finished form or in cinchona bark from which quinine is obtained.

The tea, coffee, sugar, spices, coconut and rice of the Indies will find plenty of consumers in starving countries and similar conditions will be found for kapok, hardwoods, metals and other products of the region.

As an American export market, the Indies will prove a much greater volume customer than in the past. The restoration of oil wells, rubber processing factories and mines as well as the enormous extension of hydro-electric and transportation systems are already being foreseen by Dutch Government and purchases are being made by the government on behalf of private industries who will take over as soon as conditions will permit. It is estimated that shipping to the extent of 100,000 tons in the shape of shallow draught vessels of from 1,000 to 2,000 tons will be an immediate requirement and negotiations for them have been in process in the U. S. and Canada for some time. They will probably be Diesel driven because of the almost perfect Diesel fuel available in the islands.

The exchange situation will require considerable planning. There is a surplus of exchange available in the form of credits and gold in the United States, but it is not sufficient to span the period until two-way trade can be fully developed between the U. S. and the islands and between the islands and other markets. It is believed that plenty of loan funds will be available.

The Netherlands Indies trade in the past has been about equally divided between the United States, East Asia, and Europe. The probability is that with Germany and Japan removed from the industrial picture, the United States will succeed to most of their former trade.

A final interesting observation from Dr. Honig, who is himself a chemical engineer of long experience, is that the native populations of the islands do not take to the professions at all with the exception of medicine. There will be a great need for young engineers and technicians of all kinds for rehabilitation as well as for permanent developments and the process of recruiting them is already well planned.

Electric Plants in Brazil

There are 1808 power generating plants in Brazil that are controlled by 1597 companies. Sao Paulo is the State in Brazil where most of the electricity is consumed, followed by the States of Rio de Janeiro and Minas Gerais.

The largest hydro-electric dam in Brazil is at Cubatao, Sao Paulo, which has a capacity of 1,000,000 KW., but consumes only 380,000 KW. Cubatao Dam is now classified as the seventh largest in the world, but is expected to rise to fourth place when it begins operating at full capacity.

The following list is an excerpt from the American publication "Reclamation Era," and gives the world's principal dams:

	[illegible]	[illegible]
1 [illegible] U. S. A.	[illegible]	[illegible]
2 [illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
4 [illegible]	[illegible]	[illegible]
[illegible] N. Y. [illegible] U. S. A.	[illegible]	[illegible]
[illegible] U. S. A.	[illegible]	[illegible]
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Pacific WORLD TRADE

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Chile
A Country With a Long Reach For Trade

Chile is 2,600 miles in length, from the subtropics to the subarctic, and is almost exactly divided into three contrasting regions. The upper third is desert and mountain terrain with vast mineral resources. The lower third, with its island-sprinkled coast line, is devoted to forests and grazing. The middle third is industrial and agricultural and in the latter section the major part of the population is to be found.

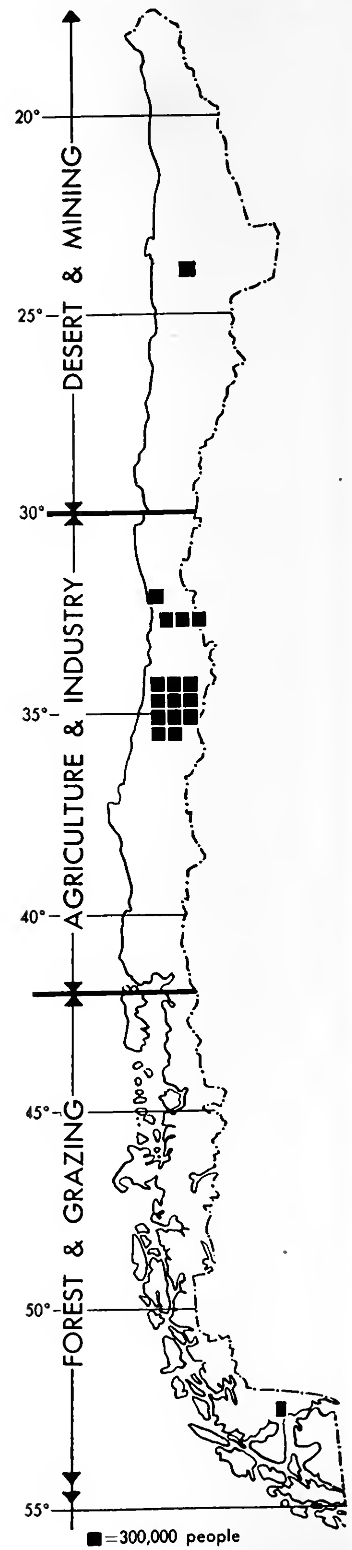
From a trading standpoint, all three of Chile's geographical sections are vital and they contribute in normal times to a fairly well balanced foreign trade, with exports somewhat predominating.

History

Chile did not arrive at its present state of civilized prosperity without a rugged and tempestuous pioneering period. Racially, the Chileans are predominantly European, with some mingling of Indian strains which are fast disappearing. During the last century immigration has fortified the early Conquistadorial blood until Chile has become quite a melting pot. British have settled along the central coast, Germans in the south, French and Italians in the cities, and quite recently the Swiss and Irish have become relatively numerous. There are still some 25,000 Araucanian Indians in the lake regions in the south and they have, for the most part, defied assimilation. Other tribes that originally contributed to the racial strains of the Chileans, have, as tribes, almost vanished.

Neither new, nor unimportant to Chilean history are the British and Irish. The early wars between the Indians and the Spanish soldiers who came down from Peru to win Chile for Spain found the Indians sturdy fighters and it took the Spaniards many years to win a foothold. They were finally overcome, however, during the period of South American Wars of Independence, under the leadership of Bernardo O'Higgins, with subsequent support from an embryo Chilean navy under an Englishman, Admiral Lord Cochran. Bernardo O'Higgins was the son of an Irish street peddler, Ambrose O'Higgins, who had joined the Spanish army and had been sent to Chile

CHILE *and the Pacific States of the United States*



Pacific World Trade

to fight against the Araucanians. His campaigns successful, he was made governor of Chile in 1788, holding that office until 1796 when he was named Viceroy of Peru. This was the start of a long series of Irish and English names in the history of Chile. Since 1883, Chile has had virtually no military disputes with its neighbors.

Economic Position

It is not with the history of Chile, but with its economic growth and future that we are concerned here. The unique shape of the country and its terrain give it a variety of economic interests comparable with those of the United States. About 40% of the population is industrial, another 40% agricultural and the remaining 20% professional and business. In this distribution, as well as in many other ways, there is much similarity between the economy of Chile and that of the United States. Most of the money that has financed the development of both industry and agriculture has come from the United States and there are few districts in the world that have needed such triumphs of engineering and human endurance as have been lavished on the mines, roads, pipe lines and railroads of Chile. Its mines are among the best equipped and best managed in existence.

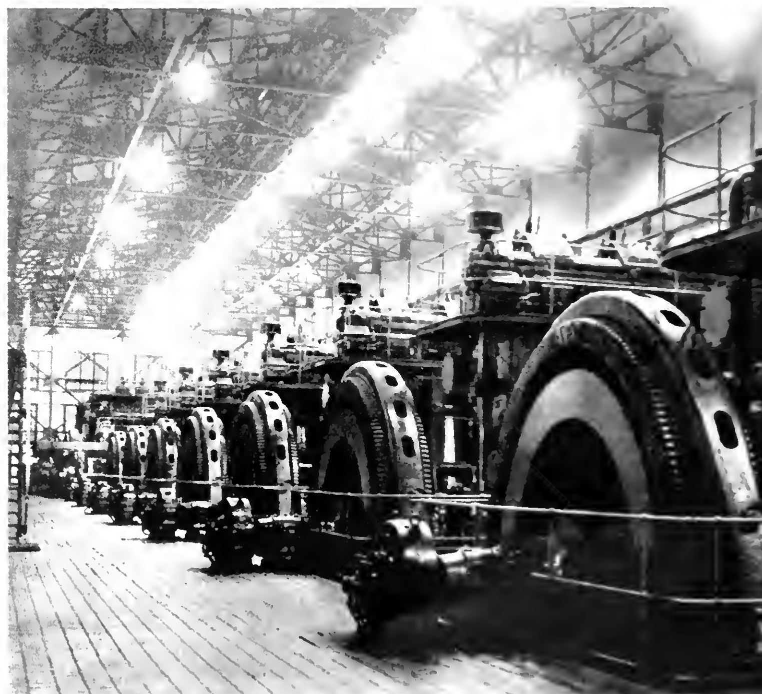
For many years the story of nitrate was the story of industrial Chile, but that era passed with the development of chemical extraction in the United States and Germany, and during recent years the country has turned to the development of its other natural resources and to the industrialization of its cities for the creation of a balanced economy.

Chilean Exports

About one-half of Chile's exports before the war consisted of $68,000,000 worth of copper. Nitrates and iodine made up another 20% and other minerals about 7% more. Wool and other animal products amounted to 7% and other agricultural products about 10%. These and other smaller items will bring the export trade of Chile almost entirely within the category of "raw materials."

Chilean Imports

Chile's imports in the prewar era were very largely from the United States. The total in 1938 was about $103,000,000 and was roughly divided into eight categories. The largest class, about one sixth, was



Top of page: Nitrate plant, night view.

Center: Nitrate plant, interior of the power house.

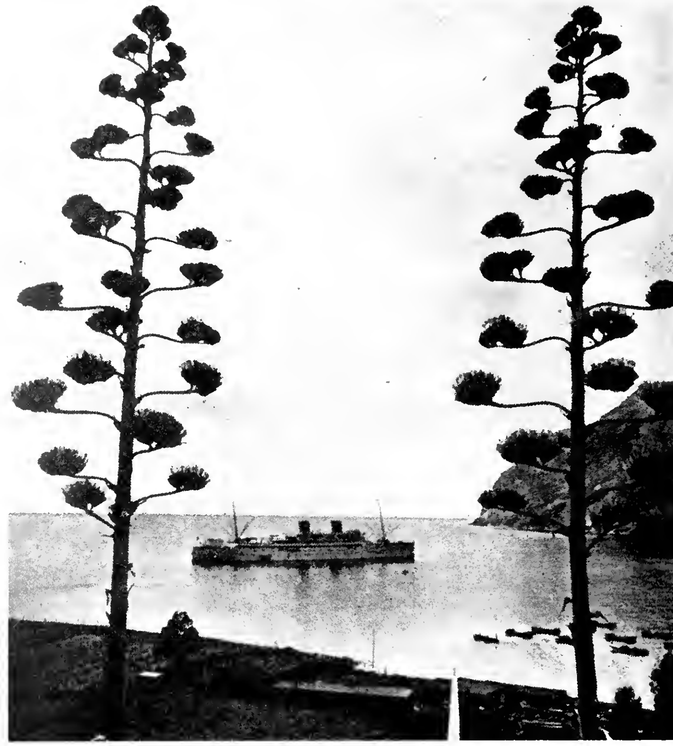
Bottom: Hotel O'Higgins.

Pacific World Trade

transport material for both railroad and highway use. Another one-sixth was textiles; about one-fifth was machinery, while chemicals, metal products, foodstuffs and agricultural products made up most of the rest.

Prospects

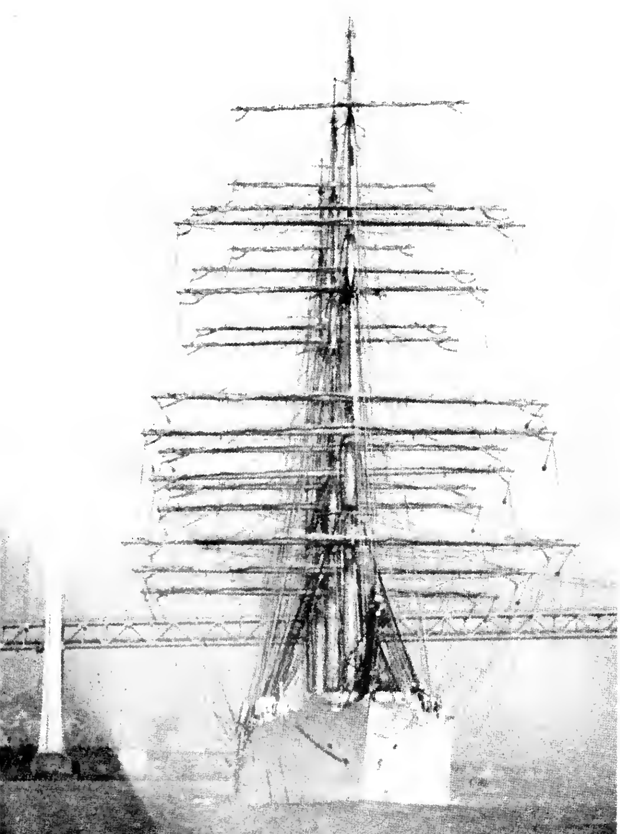
Chile, like most other progressive countries, is committed to a program of industrialization for the protection of its own economy against the fluctuations in other parts of the world. Where such industrialization results



Upper right: Isle Juan Fernandez, Robinson Crusoe's Island.

Lower left and right: The barkentine Lautaro, Chilean naval training vessel, frequently seen in American Pacific Coast ports.

Lower left shows the vessel arriving in San Francisco for installation of diesel engines by the General Engineering and Dry Dock Co. At right she is shown at sea under full sail.



Pacific WORLD TRADE

in a more prosperous country, the world at large will benefit and the United States in particular will profit. For one thing, the very industrialization itself will create a tremendous market for the machinery, mining equipment, transportation equipment and agricultural equipment in which the United States specializes. In the second place, a prosperous country is a never-ending market for the superior brands of goods of all types which American ingenuity can be depended on to offer in a never-ending stream. In the third place, whatever contributes to an increase in buying or selling in the markets of the respective countries will contribute to the prosperity of American shipping, and shipping is going to be one of the most important activities of the post-war United States.

Chile has a well-developed Merchant Marine of its own, totaling some 200,000 tons, and not a few of its people are Merchant Marine minded. They appreciate the importance of shipping, as no part of the country is more than 221 miles from the sea. If any country should ever have been called a "Maritime" country it is Chile.

While the greater populations of Brazil and Argentina have developed a greater number of inquiries for American products, in proportion to its population Chilean business men probably outnumber the rest of South America in their intensive interest in post-war American trade.

No well rounded export department should miss any opportunity offered for establishing business relations with the people of Chile. And no opportunity should be lost for making use of the things that Chile has to export to the United States.

All of South America is an Aladdin's land for the World Trader—GET YOUR LAMP POLISHED.

Scene in Patagonian loch near the southern tip of Chile.

Congressional Committees

Pacific Coast Should Have More Representation

There are certain committees of Congress whose activities are of particular interest to the shipping and industrial interests of the Pacific Coast, but on which Pacific Coast states have but limited membership, thus leaving, according to frequently heard complaint, a certain inarticulateness of West Coast interests in national affairs.

In the Seventy-eighth Congress, for instance, there are eight committees whose activities are of concern to the shipping and foreign trade interests. On these committees there are, according to the Congressional Directory of June, 1944, 200 members. The six Western States, Hawaii and Alaska have a total of only 27 members and of these 27, six memberships are held by Delegate Farrington of Hawaii and three by Delegate Dimond of Alaska. Coming from Territories rather than States, Farrington and Dimond have no vote; hence the West Coast is represented by only 18 memberships on the important committees on Naval Affairs, Rivers and Harbors, Merchant Marine and Fisheries, Interstate and Foreign Commerce, Insular Affairs, Immigration and Naturalization, Foreign Affairs, and Agriculture.

On the Foreign Affairs Committee there are 24 members with none at all from the West Coast territory.

On the Insular Affairs Committee there are 25 members with only Welch of California and Farrington of Hawaii from the Pacific.

The Interstate and Foreign Commerce Committee has 25 members with only Lea and Hinshaw of California and Harless of Arizona from the West Coast.

The Merchant Marine and Fisheries Committee has 21 members with Jackson of Washington, Welch of California and Farrington of Hawaii and Dimond of Alaska from the West.

The Naval Affairs Committee has 32 members with seven from the West. They are Magnusson of Washington, Mott of Oregon, Izac, Anderson and Johnson of California, together with Farrington and Dimond.

The Rivers and Harbors Committee has 25 members with six from the West. They are Jackson and Norman of Washington, Angell of Oregon and Carter of California, together with Farrington and Dimond.

The Immigration and Naturalization Committee has 2[illegible] members with

(Page 100, please)

Pacific WORLD TRADE

Commerce Department Expanding Facilities

(Continued from page 89)

Directory Constantly Revised

Particular emphasis is being placed on World Trade Directory reporting and every effort is being made to insure Americans trading abroad the most complete and up-to-date sales information possible. Trade lists are likewise being extended and their quality improved. That these two services are already in great demand is evidenced by the record of the past six months. Three times as many World Trade Directory reports were sought between January and June of this year as in any six-month period since Pearl Harbor, and five times as many trade list requests were handled in the first six months of 1944 as in comparable months in 1943.

At the present time, trade lists are available on many commodities in most of the other American republics. As soon as peace is declared in Europe, those lists which are not currently revised will be brought up-to-date and issued for the use of business inquirers.

Furthermore, when Foreign Service officers can take up their regular functions in the liberated and neutral countries of Europe, they will obtain new material for trade lists so that they can be reestablished for all the principal commodities and industries maintained in prewar years. Nor will new commodities be forgotten. Instructions on getting this information have already been prepared.

Replacement of obsolete information in the bureau files on European and other world areas is another project to take place as quickly as possible when peace is declared in Europe.

Foreign Information

A new flow of detailed information on developments in foreign markets is currently being established. Requests have also been prepared for up-to-the-minute reports on business conditions in specified foreign regions. These will provide details on exchange restrictions, trade controls, effects of trade agreements, as well as important market analysis data such as tastes, buying habits and purchasing power of foreign populations.

American firms engaged in international trade can look forward to obtaining the results of foreign market surveys in specific lines of business. From these investigations will come such data as methods of sales promotion, distribution channels and existing competition. American Foreign Service officers will obtain the facts both by regions and separate businesses.

Scenes from plant of Export Packaging Co., San Francisco. This company has three plants in Bay Area, employing 300 people.

Alcoa's Program

(Continued from page 87)

products for just one reason—so that Alcoa ships will carry a greater tonnage in their holds. We expect to have more ships than we had before the war—and faster ships—and they will sail more often—so we will need that additional tonnage.

The Promotion Plan

We started over a year ago to assemble the information that any manufacturer would need before he could determine whether this Caribbean market was of interest to him. You cannot sell everything down there any more than you can in any part of the world.

We first made a complete analysis of the imports of every country and colony in that part of the Caribbean area which we serve. Anyone could do this. No one had before—but anyone could. All it required was patience and perseverance, the ability to translate Dutch, French, and Spanish commercial terms, the care to change European units of measure into American and finally the job of changing guilders, francs, bolivars and British Colonial dollars into United States dollars to give a standard measuring stick. There could be no other standard of measurement applicable to all products for you will find that shipments of oil are measured in barrels—food in pounds or bushels — leather in square feet—shoes in pairs — cotton in bales—poultry feed in tons — hosiery in dozen pairs — lumber in thousand feet—oil cloth in square yards—while corsets, brassieres, girdles, printing presses, tractors, typewriters, electric refrigerators, automobiles and several hundred other products are merely counted and the number of items recorded. It took seven months to complete that study, but it made it possible for us to summarize this information in a twenty-four page booklet which gave any interested manufacturer a good over-all picture of this market.

Results of the Program to Date

I hesitate to talk about results—for the true results cannot be realized for months. A war must be won first. But the immediate results in the form of inquiries has been amazing.

We have had letters from hundreds of service men, all the way from Lt. Colonels to G. I. Joe. Peculiarly enough, there have been almost fifty times as many from men in the Army as from those in the Navy. They want our booklet "Export Market Opportunities for U.S.A. Manufacturers," and they do not want it for light summer reading. They want it because they too are thinking in terms of a job and world markets. They say as much in their letters.

So many manufacturers have written us that our chief trouble has been to give some semblance of promptness in our replies. Just when we thought we had everything organized, W.S.A. asked us to do additional work, then Selective Service stepped in and wanted two men

whom they had formerly said were too old to interest them. At the low point of our efforts we felt it necessary to write letters to over seventy manufacturers apologizing for our slowness.

Nevertheless, in spite of these minor difficulties, we have managed to work out details with one hundred and seventeen manufacturers, and to start a search for agents for them, while we have over five hundred more with whom we are not as far along the road. To be of concrete help—to be able to introduce American manufacturers to foreign agents, you will realize that we first have to know much about products and prices. Our representatives in the Caribbean could not be intelligent in their discussions without such information, and all of that takes time.

It takes time here to find out enough about a product or line of products to write an intelligent story to our people in the Caribbean—and it takes time for each of them to look over their particular part of the territory in order to suggest the right agent. The reactions of some of our agents have been most interesting. They are all leading businessmen in their communities—each a different individual with different methods and ideas. At no time did we ever suggest methods of working out the problem. All we asked for was results.

One of them went so far as to take a half-page advertisement in his local newspaper and in that space to list the products and ask interested importers to call on him. In contrast with that shot gun approach, others have worn out shoe leather and used the single rifle shot attack on a selected prospect. We do not disclose the name of the manufacturer to our agent for we do not want the selected importer to write the first letter. We want the privilege of telling the manufacturer ourselves who is interested. As far as possible, we want to keep the control of the situation in the hands of the American manufacturer.

That, as briefly as I can tell it, is the Alcoa Steamship Company's promotional story. There is nothing outstanding about it. It is the same old practical method of looking yourself over to see what you have which the other fellow would want, if he knew you had it—and then dressing it up as well as you know how, and offering it to him. There is, if you want to be technical, the minor difference that we have two people we want to interest—the prospective American shipper and the prospective Caribbean importer. But that is a technicality.

We are not the only ones in the steamship business who have done this—all the good operators do it in individual cases—and often. I think, however, we are the only ones who have tried definitely to weave it into a planned program of advertising and sales promotion. But I would suggest to any of you interested in any particular foreign markets that one of your best sources of information can be the American steamship operators serving these countries.

Go downtown some day and call on a couple of them—if you don't know which ones to see, tell me the countries you are interested in and I will give you the names of the men to see.

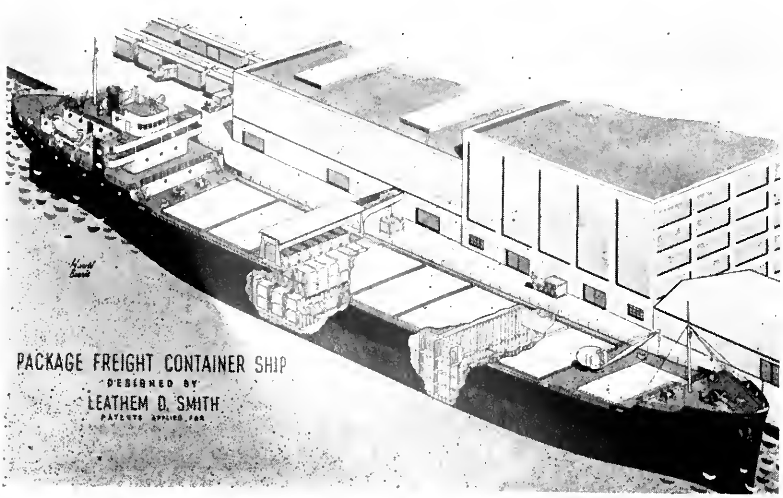
Pacific WORLD TRADE

Package Ships

While the estimates of inventors are not always the most reliable indices of success, the "risk" that is said to go with private enterprise has been known to pay off in a big way. Sometimes the inventor's estimates have proved conservative.

The best approach to the subject of "package ships" is through the need for economy of operation in certain steamship routes, the need for economy in transportation by certain industries, and the need for progressive ideas that will preserve for the shipping public the advantages of intercoastal, coastwise and inland waterway shipping which have not in recent years been adequately supported.

It so happens that the three types of carriers mentioned cater in considerable measure to volume traffic in standardized quantities, and may lend themselves to some such package ship idea as that of the Leathem D. Smith Shipbuilding Company of Sturgeon Bay, Wisconsin, which was announced recently and is pictured here. The designer claims that the use of his vessel would reduce the cost of handling certain freight on the Great Lakes from $1.20 per ton to an estimated 15c per ton. The ships will be 420 feet in length, have a 59 foot beam and will be twin screw, Diesel propelled and cost about $2,000,000.

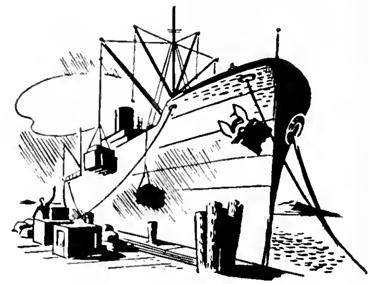


The cutaway sections in the drawing show the patented freight containers which are 9x7 feet and 7 feet high, holding about eight tons. The shipper sends his loaded container to the dock by flat car or truck and hauls away the empties for the next sailing.

The prewar practice of the railroads and truck companies in placing trap cars and trap trucks by the shipper's door for convenient loading throughout the day proved exceedingly popular with shippers and greatly expedited the train or truck make-up for the long haul. The war time practice of loading commodities on movable platforms right into the car or ship has hastened the loading and unloading operations and will, no doubt, be continued in the handling of many commodities after the war. The long-established use of vans for furniture which may be placed aboard flat cars or ships proves the merit of the system.

There are many commodities shipped over regular routes to distribution points which could be handled with speed and economy if they could be loaded in prearranged quantities in some such manner as that suggested by Mr. Smith. It is suggested that canned and dried fruit and other food products, soap, cosmetics, cereals, as well as heavy articles such as tires, plumbing fixtures and hardware could very well be handled in this manner.

The steamship companies are up against the very real necessity for reducing port costs and increasing their tonnage. Both of these objects might be accomplished by the development of some sort of large-unit shipping.



Brazilian Airplane Engine Factory

The Brazilian government airplane engine factory, located on the highway between Rio de Janeiro and Petropolis, has already started the manufacture of parts for the assembly of airplane engines. Top production will exceed 500 Wright Whirlwind 450-hp engines a year on one eight-hour shift. Ultimate hope, however, is to enter production of the larger 1200-hp engine.

Congressional Committees

(Continued from page 97)

only Stockman of Oregon and Farrington of Hawaii from the West.

The Agriculture Committee has 28 members with only Voorhis and Phillips of California and Farrington of Hawaii representing the West.

A tabulation of the above shows 10 memberships for California, 3 for Oregon, 4 for Washington, 1 for Arizona, none at all for Idaho or Nevada and as stated above 6 for Hawaii and 3 for Alaska who do not vote.

Since the Seventy-ninth Congress will have many new members the complexion of the committees may change. It would seem to be a matter worthy of thought by civic organizations in the territory affected.

The Matson Line certainly gets the advertising. This picture was drawn by Sgt. Charles D. Pearson and was cut out of the March 17, 1944, issue of "Yank" Down Under by the editor of Matsonews.

Expansion of Pacific World Trade Section

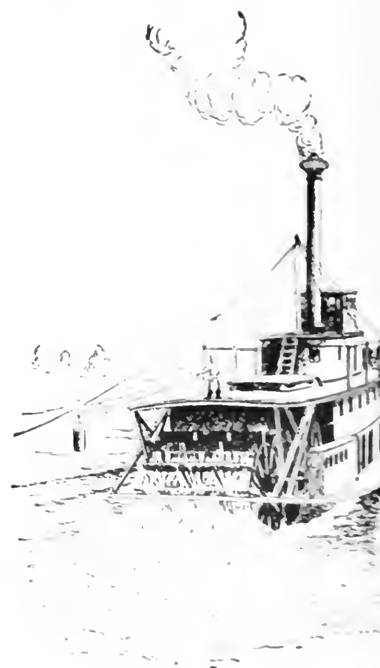
With the expansion of the Pacific World Trade Section in the Pacific Marine Review, it is our purpose to present material of a constructive and informative nature on all phases of world trade, and on shipping in its relation to world trade.

The operations of the shipping industry are in themselves world trade. But cargo and passengers are the life-blood of shipping and, of course, of ship construction and ship repair, marine insurance, export and import finance, and of the innumerable activities that go to make up world trade. Every person who is either directly, or indirectly, connected with our dealings with other countries will find constructive and authoritative suggestions from leaders in the industry. If, at times, controversial subjects are introduced, they are for the purpose of developing discussion, and the opinions of our readers will be welcomed.

Material is now in preparation on the buying and selling phases of world trade; the programs and facilities of steamship companies in the foreign, intercoastal, coastwise and inland ranges; the technical aspects of traffic, including rates, classification, routing and claims; legal matters, such as the decisions of the Interstate Commerce Commission, Maritime Commission, War Shipping Administration and Civil Aeronautics Board; the vital part that railroads, airlines and highway carriers perform; marine insurance; customs, finance, including exchange and credits; foreign countries and their markets; the ports of the coast; the ports of the Pacific; commodities, both export and import; personnel, in import and export fields. As the yachting industry again takes its place among shipping activities, we will cover it; and as sailing schedules are established, they will have a place here.

Paddle-Wheel Days In California

Not a book review, but rather an introduction to some very interesting reading for everyone who has an interest in the early day—or present day for that matter—activities on the inland waterways of California. Paddle Wheel Days in California by Jerry MacMullen, just published by the Stanford University Press is California history. It is California history built around the doings of the hardy steamboat men who played a big part in the development of the West, and all who are concerned with shipping will find the book packed with familiar names and events that are still talked about on the waterfront and in the clubs. Pictures galore as well as clever drawings by the author make the book alive. You just keep on reading from 1847 right on down to the Bay Bridge opening.

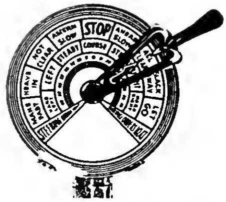


Seagoing Gardens

Not a new idea, but in a recent post-war essay contest, a 17-year-old girl, Rosemary Deiters, of Mount Joseph, Ohio, envisions the day when vegetable gardens will float from New York to London and other parts of the world aboard ocean-going liners, supplying passengers with vegetables picked fresh that day, through the use of hydroponics—soilless gardening.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

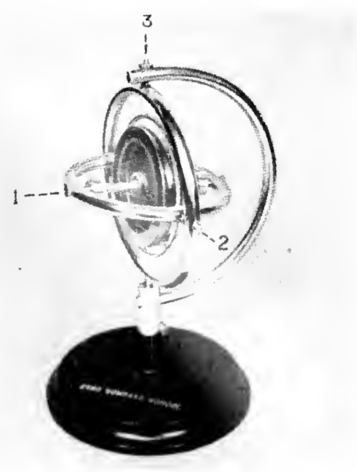
The Gyro-Compass

Part I

THE GYROSCOPE

The word "gyroscope" is a combination of two Greek words, "gyros" meaning turn, or revolution, and "skopein" meaning literally "to view the revolution of the Earth." The distinction of originating the word "gyroscope" is claimed by the French, this claim being based on the fact that one Leon Foucault in 1852 succeeded in developing a gyroscope through which, with the aid of a microscope, he could observe the movement of the Earth's rotation. Fact is that the Earth itself is a large gyroscope—having all of the characteristics of a mechanical gyroscope.

Fig. 1: The gyro has three axes of rotation.



Now there is nothing mysterious about a gyroscope. While its actions seem contrary to the laws of nature, they are really in accordance with the Laws of Motion, the theory of which was propounded by Sir Isaac Newton. Many of the toys of our childhood days, such as baseballs, tops, hoops and the front wheel of a bicycle, were in reality gyroscopes; at least all had the characteristics of a gyroscope. When we stop to consider that a gyroscope may be defined simply as a spinning mass, or wheel, universally mounted—that is, a spinning wheel which is free to turn in three directions, i. e., on its own axis; around its vertical axis, and around its horizontal axis, we can readily understand that the toys mentioned above fulfilled all three of the requirements of a gyroscope. In addition to being a spinning mass, or wheel, universally mounted, the gyroscope makes use of two laws of motion. One of these laws of motion is known as "INERTIA," more often known as "RIGIDITY IN SPACE," and the other is known as "PRECESSION." To understand the principle of a gyroscope it is necessary that you fully understand the meaning of these two terms.

Take the first term—INERTIA. The word inertia literally means **a state of rest,** or the tendency of a spinning mass, or wheel to maintain its plane of rotation. That is, any body set in motion which has great enough speed to overcome the friction between itself and the bearings which support it, will continue to remain fixed in the direction in which it is pointed as long as such speed is maintained, unless its direction is changed by some force. For instance, take the simple hoop which you rolled along the road in your childhood days. A hoop has all of the characteristics of a gyroscope; it has freedom to roll, which is similar to a spinning wheel; it has freedom to turn on its vertical axis; and it has freedom to turn on its horizontal axis, that is, freedom to fall over flat on the ground. Just as long as this hoop has sufficient speed to keep it rolling it retains all of the characteristics of a gyroscope. As another example of one of our toys of our boyhood days which exhibits the characteristics of a gyroscope, consider the front wheel of a bicycle. Take the hoop we were just talking about, put spokes in it, put an axle in it, mount it between two forks, and we have the front wheel of a bicycle.

Or, we can take this same hoop, put some spokes and an axle in it, mount it on a bearing within a ring; place this ring within a second ring, and mount both the wheel and the rings so that only one point—its geographic center—is fixed, as in Figure No. 1. Once this is done we have a gyroscope with three axes of freedom; that is, the wheel and the rings within which it is mounted can turn in any direction because (a) the wheel is free to turn on its axis; (b) it is free to revolve about its vertical axis; and (c) it is free to revolve about its horizontal axis. Therefore,

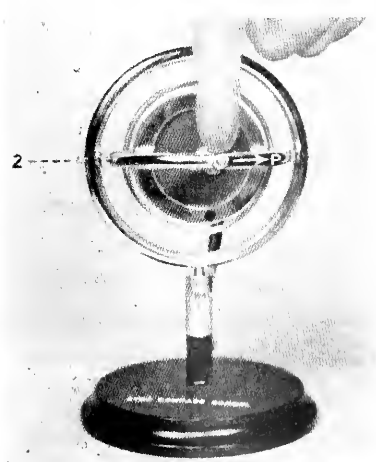
Fig. 2: The gyro's original plane of rotation is maintained regardless of how the base is moved about.

Fig. 3: Inertia.

being universally mounted, the axis of this wheel can be pointed, or turned, in any direction without altering or destroying the geographical center of these assembled parts. If this wheel is set turning at a relatively high rate of speed, you will discover that its axis will remain in the direction in which it is pointed regardless of the direction in which the rings within which the wheel is mounted are turned, or the base upon which this assembly is mounted is tipped. This is fully demonstrated in figure No. 2. Think back to your childhood days and you will remember that once your hoop was set rolling down the street it continued to roll in a straight line as long as its speed was maintained.

Let's get back once more to the word "INERTIA" (a $64.00 word which was defined by Sir Isaac Newton in his Laws of Motion, as being in a "state of rest"). He stated further that **"every body continues in a state of rest or of uniform motion in a straight line unless it is compelled by some force to change that state or direction."** And this spinning mass, or wheel, which we call a gyroscope, will remain with its axis pointed in the direction in which it is set **unless this direction is changed by force.** This brings us to the second $64.00 word which is known as "PRECESSION"—the second characteristic of a gyroscope.

Fig. 5: Precession about the vertical axis.



Webster says "PRECESSION" is a change in the direction of the axis of a spinning body. The effect of "PRECESSION" is to cause such a body to rotate about a line or point perpendicular to its original direction. If pressure is applied to the horizontal axis of a spinning body it meets with resistance and the spinning body, instead of turning about its horizontal axis, "PRECESSES" or turns about its vertical axis. And, if pressure is applied to the vertical axis of a spinning body it again meets with resistance, and instead of turning about its vertical axis it "PRECESSES" or turns about its horizontal axis.

Think back twenty, thirty, or forty years ago when you were a boy riding your bicycle and you will see how, unknowingly, you took advantage of both characteristics of a gyroscope. Recall that you pumped hard on the pedals and got up some "speed," and that when you got going several knots you would act "smart" before the girls of your neighborhood and let go of the handlebars—and the bicycle would continue in a straight line as long as you maintained fairly good speed. You took advantage of one of a gyroscope's characteristics—INERTIA—in doing this, but you didn't know it.

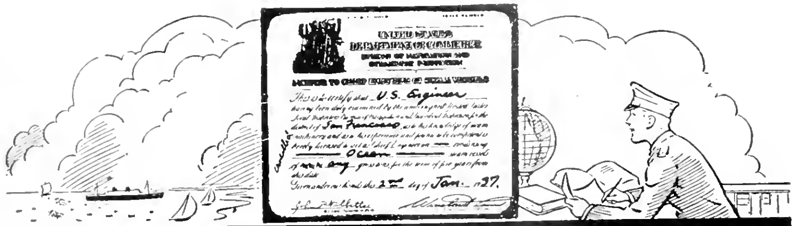
Then you would go on and get a little "smarter." You would show the girls that you could turn corners without touching the handle bars. To do this you would simply lean in the direction that you wanted to turn, and lo and behold, the front wheel of your bicycle would turn in the direction in which you leaned, and off you would go in that direction! What caused it to do this? Well, the answer to this question is that you again took advantage of the second of a gyroscope's characteristics—PRECESSION—in doing this, but you didn't know that either! By leaning to either one side or another you caused pressure to be put on the horizontal axis of the front wheel of your bicycle, and this pressure caused the wheel to "PRECESS" or turn about its vertical axis, and head you off in another direction where you could find more girls to whom you could show off your smart tricks.

Fig. 4: Precession.

Now then, we can get down to brass tacks and define the word PRECESSION, which may be defined as the tendency of a spinning body to turn at right angles from its plane of rotation when pressure is applied to its horizontal axis. PRECESSION may be illustrated by applying pressure to the gyro about its horizontal axis as shown in Figure 5. This pressure meets with resistance and the gyro, instead of turning about its horizontal axis, turns or "precesses" about its vertical axis. Furthermore, if pressure is applied about its verti-

(Page 105, please)

Fig. 6: Precession about the horizontal axis.



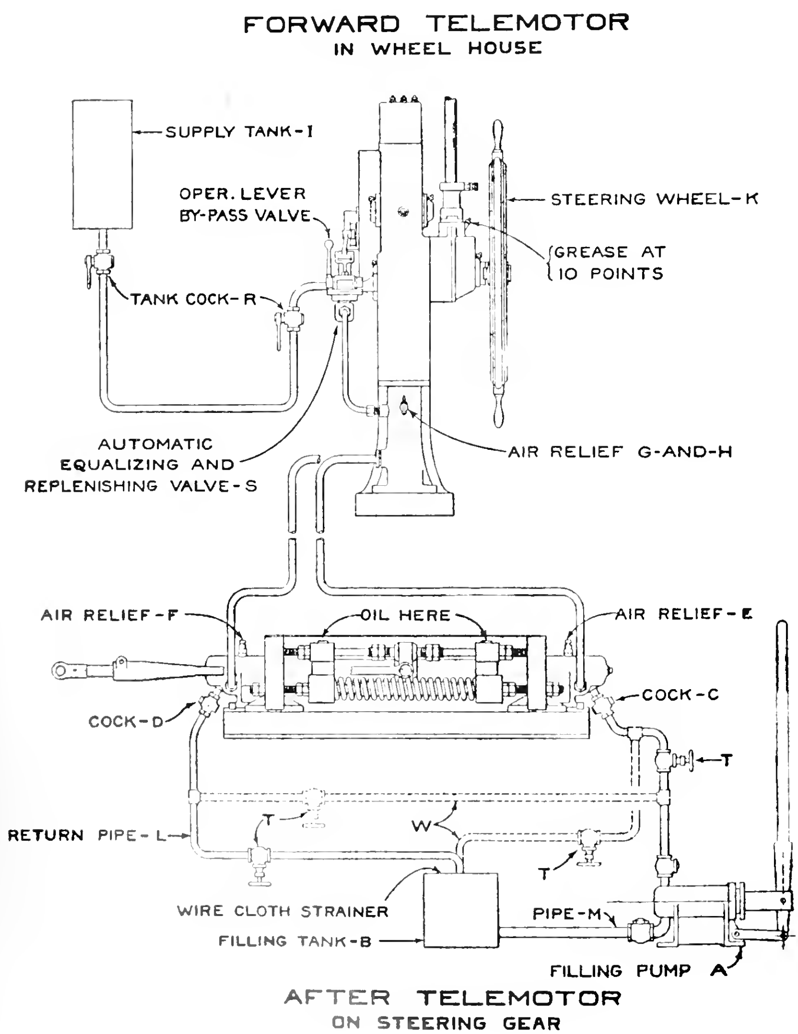
Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco 11, California

Hydraulic Telemotors System

Stetson-Ross Steering Gear on Tankers



The importance of careful installation can not be over emphasized, as successful functioning of the ships' operation depends so much on the reliability of the forward and after telemotor. The two pipes connecting the forward telemotor or transmitter, located in the wheel house, with the after telemotor or receiver which is located in the steering gear room, and connected to the steering gear controls, should be arranged as directly as possible, eliminating all unnecessary bends or loops.

These pipes are specified to be seamless, drawn steel tubing, 7/8" outside diameter, and therefore will be smooth on the inside, but means should be taken to blow out any scale or foreign material before filling with the hydraulic fluid. The lines should not have upward swung loops unless a bleeder cock is provided at such places to purge out air which might have a tendency to be trapped therein. Elbows should not be used, but pipes should be bent on long radii, wherever required. If welding or brazing is used in assembly, precautions must be taken to avoid entry of welding material into the pipe which might partially close the opening. It is a good plan to avoid running these lines adjacent to overheated points which might volatilize the fluid therein.

Hydraulic fluid such as light oil, known as Standard "Seal," is recommended as a suitable medium with which to charge the telemotor system. Some operators prefer to use water which is satisfactory providing that some soluble lubricant medium is mixed with it. Also in cold climates, if water is used, precautions should be taken against freezing. In such conditions a non-freezing mixture, utilizing up to 60% glycerine with 40% water may be used. This would afford protection for temperatures as low as 30° below zero. If temperatures lower than 30° below zero are expected, a non freezing oil must be selected because even if the liquid has a tendency to thicken up it will impair the ease of control and endanger the efficiency of steering the ship.

Referring to the accompanying diagram, note that the forward telemotor which is located in the wheel house is provided with a supply tank I which should be hung in plain sight, two or three feet above the point of connection to replenish valve S. This tank is provided with a gauge glass

so that a reasonable level of oil will always be maintained. In operation, the automatic equalizing and replenishing valve S is opened every time the steering wheel comes to "midship" position. This allows oil to flow by gravity into the system from tank for the purpose of making up any loss of fluid.

The diagram shows the after telemotor provided with a filling tank B and a filling pump A. These units should be mounted on the deck in the steering gear room and connected to the after telemotor as shown on the diagram. Fluid with which to charge the system is poured into filling tank B and pumped by hand to fill the whole system up to and including supply tank I in the wheel house.

Filling the System

Whatever hydraulic fluid is selected must be filtered or carefully strained through cheesecloth to remove all foreign material before being used.

After all pipe lines have been blown out and tanks thoroughly cleaned, pour hydraulic fluid into tank B; then open valves T and cocks C and D as well as tank cock R in the wheel house, also equalizing and replenishing valve S by means of moving operating lever to Port, then start pump A which will draw oil from tank B through pipe M forcing it up the line to the forward telemotor and through the equalizing valve to supply tank I, returning through the opposite side of both telemotors and pipe L and cock D to the pipe discharging into tank B.

The dotted lines W shown on the diagram of the after telemotor represent pipes which may be added if desired, making it possible to pump oil through the system in the opposite direction to that described in paragraph 2. The use of this extra line is not absolutely necessary but might facilitate working the air out of the system.

Filling pump A should be operated continuously and fluid added to tank B until there is sufficient in the system to make a continuous flow throughout and it is certain that all remaining foreign particles have been washed out of the lines; then tank B should be drained and new, fresh, clean fluid introduced, filling the whole system. The various air relief valves in the following sequence may then be opened for purging out any trapped air: E, G, H and F. If pipe lines W are available, the circulation of fluid and the sequence of bleeding the air may then be reversed for greater thoroughness of air elimination. The fluid level in filling tank B must be maintained to prevent air entering pipe M and being drawn into the system.

After it has become reasonably certain that all air in the telemotor system has been eliminated, supply tank I should be filled about ¾ full by continued operation of pump A, valves T and cocks C and D should then be closed. By moving operating lever on bypass or equalizing and replenishing valve S toward Starboard, the telemotors are now made ready to control the steering of the ship.

By testing with the steering wheel, the presence of air in the system will become apparent if the after telemotor does not respond in exact proportion to the movement of wheel. It is a good plan to move the wheel several turns right and left for a few minutes, after which bring it to "midship" and then open air relief cocks G and H to determine if any exists in the cylinders. Tank cocks R must obviously be open at all times when steering so that fluid can flow from tank I into the system, which occurs when steering wheel is "midship" for the purpose of replenishing any loss of fluid that might occur through defective pipe joints or packings.

Steady As You Go!

(Continued from page 103)

cal axis, the gyro will precess about its horizontal axis as shown in Figure 6. The direction in which precession takes place can be remembered easily if you regard the pressure as though it acted at a single point on the rim of the wheel, indicated by the black dot in Figure 5. This point will not move, but instead, in response to the pressure, a point 90 degrees beyond, in the direction of the wheel's rotation, will move away instead.

While it is alright to make use of the two characteristics INERTIA and PRECESSION of a gyroscope to amuse and astound the girls, and in making toys, without the use of two additional natural phenomena, i. e. the rotation of the earth, and the pull of the earth's gravity, we could never have a gyro compass. Without these we would have nothing but a gyroscope, which would be of no earthly use to us on a ship or in a plane. However, by making use of the earth's rotation, together with the force of gravity, we can convert a gyroscope into a gyro-compass; an instrument which will indicate TRUE NORTH regardless of position on the earth, or magnetic conditions aboard ship. A good definition of gyro-compass is: "A mechanically operated north seeking device, its north seeking ability dependent upon the rotation of the earth and the force of gravity."

In the next issue I will proceed with an explanation as to how the earth's rotation and the force of gravity are hitched to the gyroscope to convert it into a gyro-compass.

Figures 1, 2, 5 and 6 used by courtesy of Sperry Gyroscope Company, Brooklyn, N. Y.

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"How Cleveland Diesel Answered the Call"

A bound volume of 128 pages, a complete report of war production at the Cleveland Diesel Engine Division of the General Motors Corporation, was presented to the employees of the division recently.

The book includes the progress made by this division in supplying engines for the U. S. Navy, with a brief history of the Winton Engine Company, predecessor of the Cleveland Diesel Engine Division. This history clearly establishes a basis for the results attained in the war years.

Every phase of the development in the production of diesel engines, the inclusion of the contracts held, the expansion of plant facilities, with graphs included that describe the production increases that accompanied these changes, and a section devoted to pictures of vessels powered by engines built by the division, take up a good part of this record of progress.

Alameda Plant as seen from the Oakland Estuary.

An Up-To-Date Ship Repair Plant

The United Engineering Company, Ltd., of San Francisco and Alameda, have now nearing completion a very extensive program of expansion of their ship repair facilities.

The history of this well-established shipbuilding and ship repair company dates back to 1896, when S. J. Eva, H. P. Gray and J. R. Christy opened a plant on Spear Street in San Francisco, known as the United Engineering Works, and engaged in the construction of marine machinery and marine repair work. Including many small vessels built for the Alaska gold rush, the business grew to such volume that it was found necessary about 1902 to build and operate a shipyard near Webster Street in Alameda. In this plant two marine railways were installed and many Pacific Coast type steam schooners were outfitted with machinery. Sixteen steel vessels were also built there; hence the reason for the present company choosing the number 17 for its first U.S.N. fleet tug.

At the beginning of the last war in 1916 the Bethlehem Shipbuilding Corporation acquired the United Engineering Works, but H. P. Gray bought back the old San Francisco plant of United Engineering Works from the Bethlehem Corporation and again engaged in the ship repair business under the title of the United Engineering Company. The business of this company expanded so during the last war, that the old Risdon Iron Works at Steuart and Folsom was purchased and shortly thereafter the Moynihan Boiler Works at Fremont and Folsom, San Francisco, was acquired.

Early in 1941 the company entered into a contract with the U. S. Navy for the building of five (afterwards increased to 21) fleet tugs and a site was obtained, from the Southern Pacific Railroad, for a plant on the Alameda side of the Oakland estuary. Here the keel of the first tug, the U.S.S. Menominee, was laid on September 24th, 1941, and up to date United has delivered nineteen of these vessels to the U. S. Navy. On the completion of the outfitting of the remaining two tugs the company will devote practically all of its activities to repair work. In connection with the tug construction, Captain C. O. Kell, U.S.N., until recently supervisor of shipbuilding for the

Main office and repair shops, San Francisco.

12th Naval District, wrote the United: "You have done a splendid job, and this has been attained only through fine personal spirit and attitude on the part of your personnel. United Engineering is to be congratulated on its performance in the new construction program."

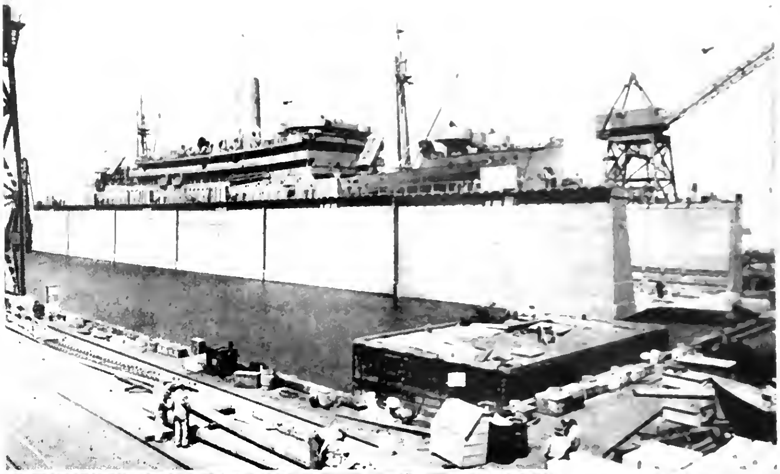
In the Alameda plant United has, in addition to its new construction and outfitting facilities, berthing space for five vessels in repair and extra berthing space for repairing three more vessels is now under construction. A large floating drydock has been in operation continuously since June, 1943, and two more drydocks are planned for the very near future. Additional necessary repair shops are also being constructed and equipped.

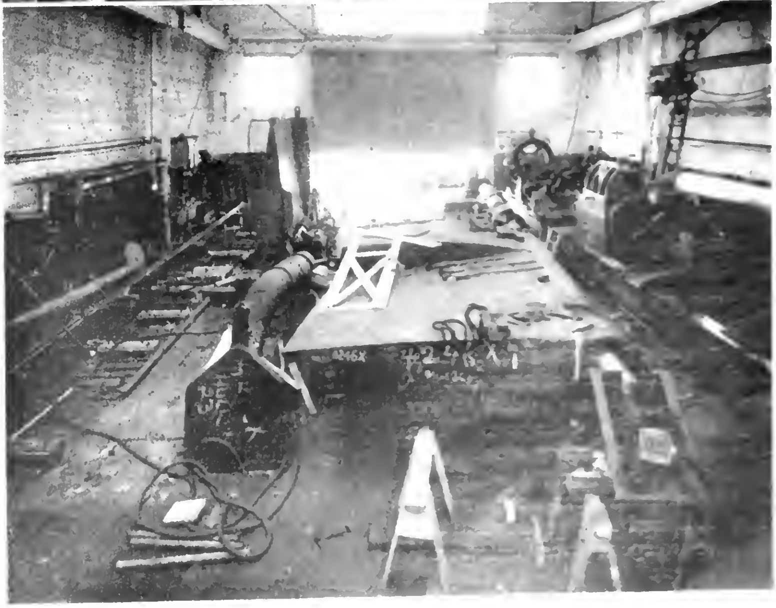
The San Francisco plant of United at Steuart Street has more than doubled its repair facilities during the last three years and across The Embarcadero the company retains Pier 20 and its berths for the repair of U. S. Navy vessels.

Some indication of the growth of the company may be gathered from the increase in the number of employees on the payroll; in 1940 that number was about 400, today it is 4300.

Both repair bases have had their share of combat vessels, including destroyer escorts, destroyers, transports, supply vessels and escort aircraft carriers. On the completion of these facilities the United Engineering Company will be one of the most important repair plants in the San Francisco Bay area.

The company is under the able management of Robert E. Christy, president and the son of one of the founders. The other officers are Harrison S. Robinson, vice president; George Sutherland, vice president and general manager of the Alameda yard; Robert W. Macdonald, vice president; D. B. Maturin, secretary-treasurer; Sidney Fraser, assistant secretary. The San Francisco plants are under the capable direction of the well-known San Francisco marine repair engineer, James Bullock.





Top of page: Ship in floating drydock at Alameda Plant.

Center: Marine repairs Machine Shop.

Bottom: Another view of the Machine Shop.

On the Ways — SHIPS IN THE MAKING

Standing alongside his wife, sponsor of USS Risk, is Commander E. F. Buck (left), assistant superintendent of Shipbuilding at General Engineering & Dry Dock Co., Alameda. Captain William W. Hastings, supervisor of Shipbuilding, San Francisco, is at the right.

USS Risk Launched At GEDDCO

The USS Risk, a Navy mine sweeper, was launched on November 7 in the General Engineering and Dry Dock's shipyard in Alameda, California.

Mrs. Eleanor F. Buck, wife of Commander E. F. Buck, USN, the assistant supervisor of shipbuilding at the yard, acted as sponsor.

The event was remarkable inasmuch as it marked the near completion of the company's U. S. Navy ship construction contracts. When the six minesweepers, now being outfitted are in commission, within the next few months, the company will have delivered four net tenders and 25 mine sweepers, a very noteworthy achievement.

Marinship Opens Food Canteen

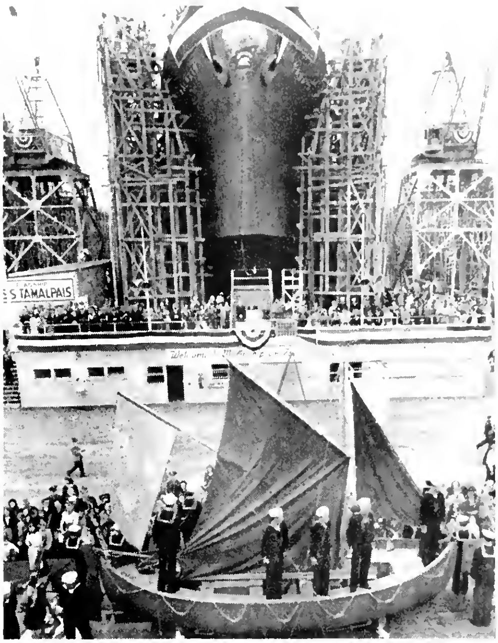
On November 1, the first two units of a series of six canteens were opened for service with hot food, served appetizingly and rapidly, for the 15,000 employees of the Marin County shipyard. The new system represents the combined planning of labor, management and the U. S. Maritime Commission in meeting a problem which has existed in nearly all shipyards.

Each of the six special food dispensing buildings is attractively painted, and is named for one of the leading ships built at Marinship. Built-in electrical fixtures keep the served food hot until it is removed by the worker who has already dropped his money in the turnstile. The worker selects his food by choosing the counter and turnstile serving the entree which he wishes.

This system, chosen after considerable study, is designed to meet the problem of serving several thousand employees who have only half an hour for lunch. The new units will, of course, be open for lunch periods on all three shifts: 12 to 12:30 p m. for day shift; 8 to 8:30 p. m. for swing shift; and 4 to 4:30 a. m. for graveyard shift.

AMERICA'S LARGEST SHIP PROPELLER

This giant manganese-bronze four-bladed, one piece propeller is the fifth of six identical screws being fabricated by Baldwin's Cramp Brass and Iron Foundries Division at Philadelphia, for installation on the largest vessels of their type ever built in this country. The ships, now under construction, will be combination ore and cargo carriers for use in war and for peace-time transport. The propellers are 22 feet in diameter and weigh around 70,000 pounds each.



One of the many floats in the unusual parade passes by the head of Way 5, which was a reviewing stand for distinguished officers of the Army, Navy and Marine Corps.

Marinship's Flagship

To become the flagship of a fleet of sixty-two vessels already launched, the Navy oiler USS Tamalpais was christened at Marinship in Sausalito, on October 29, before a crowd of over 20,000 persons.

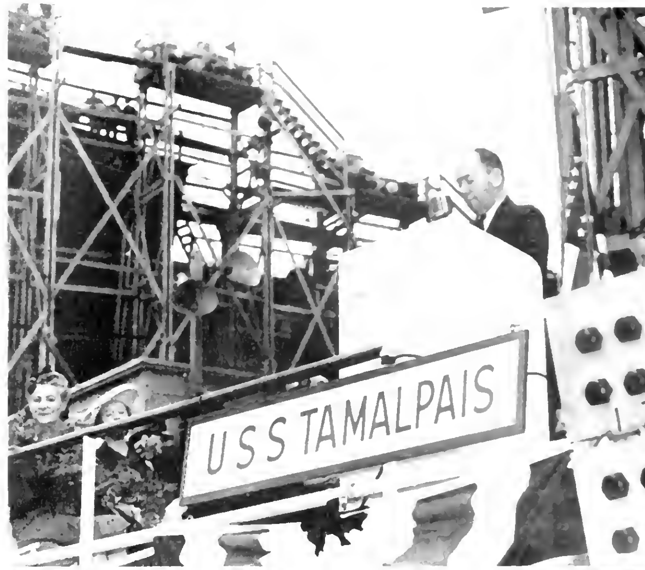
In the presence of high ranking Army and Navy officers, the 523-foot high speed tanker was christened by Mrs. H. B. Anderson, a Marinship employee for more than two years. The ship is named for Mt. Tamalpais, famous green-sloped peak at whose foot the scenic shipyard is located.

"Without ships of this type the operations of our great battlefleet would be impossible," declared Vice Admiral David W. Bagley, Commander of the Western Sea Frontier, as he accepted a Marinship flag from the hands of L. H. Lucas, hull supervisor, whose men built the powerful 10,000-hp ship. The flag will be placed aboard the oiler when she is commissioned, denominating her as flagship of the Marinship fleet.

At right, top: William E. Waste, v.p. and gen. mgr. of the Sausalito yard, welcoming his fellow workers and friends to Marinship's Flagship Day.

Center: Mrs. H. B. Anderson, yard employee, proudly christens the USS Tamalpais, flagship of the Marin-built fleet of tankers.

At right: Most popular feature of the day was a tour of the SS Buena Vista Hills.

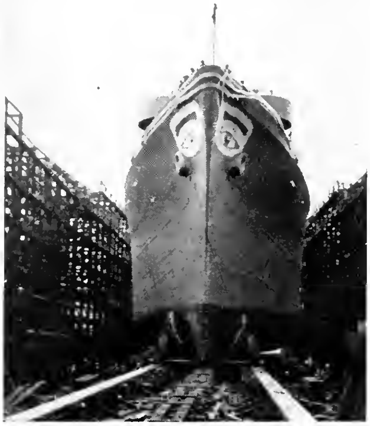


and Navy transports. Eleven others delivered were naval tankers, frigates and Army transports.

Thirty of the ships were of the Commission's long-range, fast type and included seven Victory cargo, five C-type cargo and 18 standard tankers. Others delivered were: 51 Liberty cargo, nine coastal cargo, one concrete cargo and one concrete barge.

The number and types of vessels built by all yards during October follow:

Shipyard	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.	4	Tankers
American Shipbuilding Co., Cleveland, Ohio	3	Military Type
Barrett & Hilp, San Francisco, Calif.	1	Concrete Barge
Bethlehem-Fairfield Shipyard, Inc., Baltimore, Maryland	7 3	EC2 Cargo Victory Cargo
California Shipbuilding Corp., Wilmington, Calif.	4	Military Type
Consolidated Steel Corporation, Wilmington, Calif.	4	Military Type
Delta Shipbuilding Co., Inc., New Orleans, La.	B	EC2 Cargo
East Coast Shipyards, Inc., Bayonne, New Jersey	4	Coastal Tankers
Federal Shipbuilding & Dry Dock Co., Kearny, New Jersey	2	Military Type
Froemming Brothers, Inc., Milwaukee, Wisconsin	1	Coastal Cargo
Globe Shipbuilding Co., Superior, Wisconsin	1	Coastal Cargo
Ingalls Shipbuilding Corp., Pascagoula, Mississippi	1	Coastal Cargo
J. A. Jones Construction Co., Inc., Brunswick, Georgia	5	EC2 Cargo
J. A. Jones Construction Co., Inc., Panama City, Florida	5	EC2 Cargo
Kaiser Cargo, Incorporated, Richmond, Calif.	2	Coastal Cargo
Kaiser Company, Incorporated, Swan Island Yard, Portland, Oregon	6	Tankers
Kaiser Company, Incorporated, Vancouver, Washington	9	Military Type
Leathem D. Smith Shipbuilding Co., Sturgeon Bay, Wisconsin	1	Coastal Cargo
Marinship Corporation, Sausalito, Calif.	2	Tankers
McCloskey & Company, Tampa, Florida	1	Concrete Cargo
Moore Dry Dock Company, Oakland 4, California	1 2	Military Type C-Type Cargo
North Carolina Shipbuilding Company, Wilmington, North Carolina	5	Military Type
New England Shipbuilding Corp., South Portland, Maine	9	EC2 Cargo
Oregon Shipbuilding Corp., Portland, Oregon	8	Military Type
Pennsylvania Shipyards, Inc., Beaumont, Texas	2	C-Type Cargo
Permanente Metals Corporation, Richmond, California	6 4	Military Type Victory Cargo
Pusey & Jones Corporation, Wilmington, Delaware	1	C-Type Cargo
St. Johns River Shipbuilding Corp., Jacksonville, Fla.	5	EC2 Cargo
Southeastern Shipbuilding Corp., Savannah, Georgia	4	EC2 Cargo
Sun Shipbuilding & Dry Dock Co., Chester, Pa.	6 1	Tankers Army Transport
Todd-Galveston Dry Docks, Inc., Galveston, Texas	2	Coastal Tankers
Todd-Houston Shipbuilding Corp., Houston, Texas	8	EC2 Cargo
Walsh-Kaiser Co., Inc., Providence, R. I.	2	Military Type
Walter Butler Shipbuilders, Inc., Superior, Wisconsin	3	Coastal Cargo
Welding Shipyards, Inc., Norfolk, Virginia	1	Tanker
Western Pipe & Steel Company, San Francisco, Calif.	1	Military Type



SS Robin Hood sliding down the ways at Moore Dry Dock Co. in Oakland.

Busy Days at Moore Yard

The second C-2 vessel to be launched within eight days from the five-shipway west yard of the Moore Dry Dock Company hit the waters of the Oakland Estuary on October 28. She was the SS Robin Hood, a Maritime Commission cargo carrier of just under 14,000 tons.

Sponsor was Mrs. Uda Waldrop, wife of a well-known California musician. The ship was named after a clipper built in 1854 at Medford, Massachusetts.

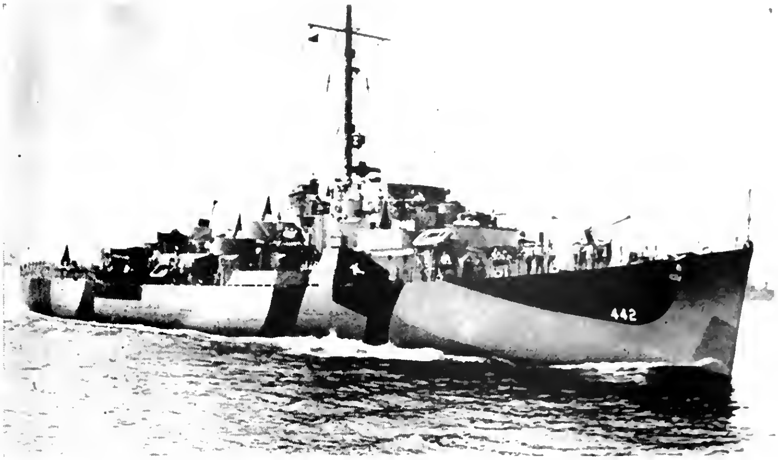
The yard from which the ship was launched is currently concentrating its manpower and facilities on AKA and APA assault ships for use in the Pacific war. A number of the latter vessels, the hulls of which were built at another California shipyard, were towed to Oakland for completion at Moore's.

A second yard under the same management is completely given over to repair and conversion work, having completed over 1600 jobs since December 7, 1941.

145 Ships in Answer To Pleas

Delivery in October of 145 ships, 53 for military use, is the answer of merchant shipbuilders to pleas of naval and maritime officials for more rapid production of assault vessels.

Of the 53 vessels delivered to the armed forces, the Maritime Commission announced that over half are for use as combat-loaded transports, some as combat-loaded cargo ships



LATEST EDITION

Newest type of destroyer escort being completed at U. S. Steel's Federal shipyard at Port Newark. First picture of this model to be released by the U. S. Navy. This "Sub Killer," because of the introduction of geared turbine power plants not available when this type of warship was first built, can outspeed, out-maneuver and outfight the best of subs and also carries enough ack-ack to protect itself.

Some California Launchings

Launched from October 15 to November 15:

California Shipbuilding Corporation, Wilmington, California:

20th combat loaded transport, SS Botetourt, launched October 19.

387th ship launched at yard, SS Bland, combat loaded transport slid down the ways October 26.

388th ship, a combat loaded transport, SS Bosque, launched on October 28.

389th ship, the attack transport SS Bowie, launched on October 31.

391st ship, an attack transport, SS Broadwater, launched November 5.

Consolidated Steel Corporation, Ltd., Wilmington Shipbuilding Division:

USS Cortland, combat transport, launched on October 18.

M.S. Clove Hitch, third of new design long range cargo ships, launched on October 21.

USS Crenshaw, combat transport, launched on October 27.

USS Crittenden, combat transport, launched on November 6.

M.S. Turk's Head, fourth motorship of the yard, launched on November 16.

Marinship Corporation, Sausalito, California:

Tanker, SS Montebello Hills, was launched October 21.

Navy oiler, USS Tamalpais, the Marinship flagship, launched on October 29.

Tanker, SS Baldwin Hills, launched on November 19.

General Engineering and Dry Dock Co., Alameda:

12th Naval District launching

Large fleet mine sweeper, USS Risk, launched on November 7

Report on Marinship's "First"

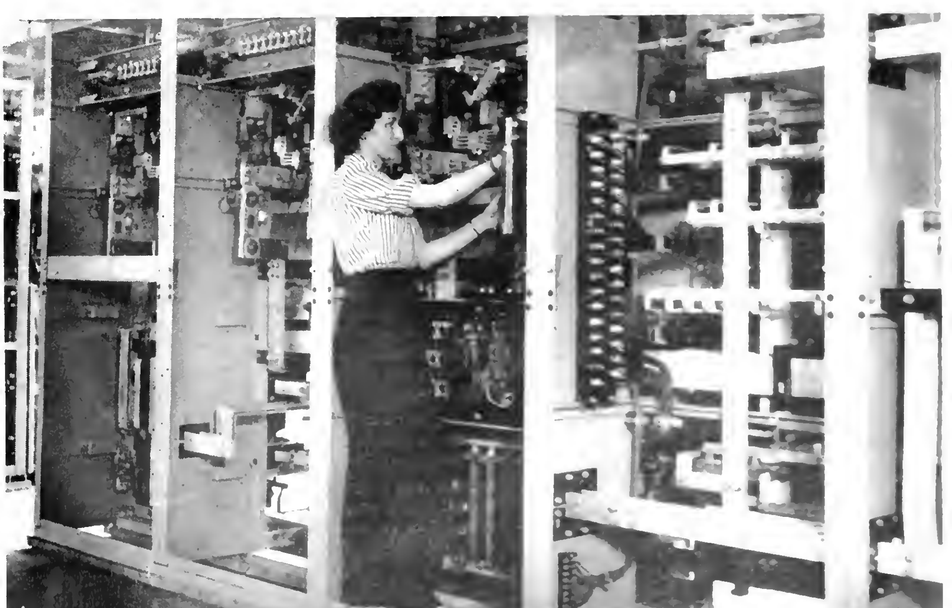
Marinship's first vessel the Liberty ship **William A. Richardson**—is still doing an outstanding job on the sea lanes of the world, workers at the Sausalito shipyard recently learned.

The doughty ship put the climax on two years of unceasing work by taking an important part in the landings on Normandy beaches on D-Day, according to H H Spomer, who recently returned in a convoy with the ship from a Mediterranean port.

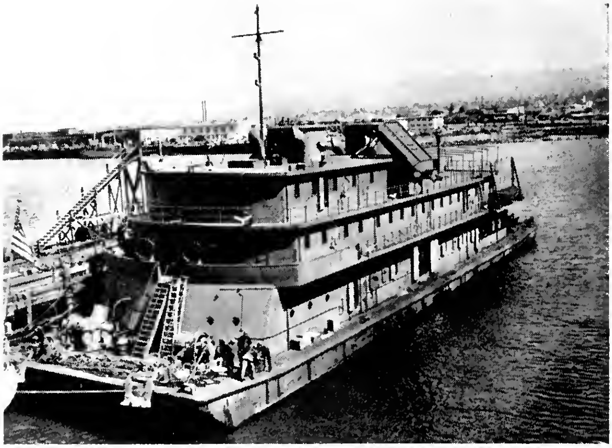
"An officer on the Richardson told me that despite the many thousands of miles she has traveled, the ship is still mechanically perfect," Spomer declared. "I could easily see that she is in better shape than other cargo ships launched many months later

FOR VICTORY SHIPS

Destined for installation on Victory ships being built in West Coast yards from Vancouver, B. C., to San Pedro, California, switchgear units similar to that pictured here are flowing down the assembly line at the Westinghouse Electric and Manufacturing Company plant at Emeryville, California. Miss Jean Neitling is shown working in a cubicle which houses the mechanisms needed to connect 300 kilowatt auxiliary generators to the main ship's service electrical bus



Clean Oil for a Floating Power House



The power barge Electra, illustrated herewith, was built for the U. S. Army Engineers by the General Engineering and Dry Dock Company, Alameda, California, yard. This barge supports an electric power plant consisting of eight 16-cylinder, 2-cycle General Motors diesel engines, each driving a 750-kva electric generator. These engines and generators are guaranteed to carry a 25 per cent overload for from 10 to 12 hours, so the power house has a normal output of 6000 kva and a peak output of 7500 kva.

Each of the eight prime power diesels is equipped with a Winslow Full-Flo lube oil conditioner through which all lubricating oil must pass on its way to the bearings. Each conditioner has a large capacity, containing 38 elements which assure a thorough conditioning of the lube oil at all times.

Winslow duplex fuel filters are also installed on each of the 16-cylinder diesels. Elements can be replaced when needed without engine stoppage, thus insuring continuous operation.

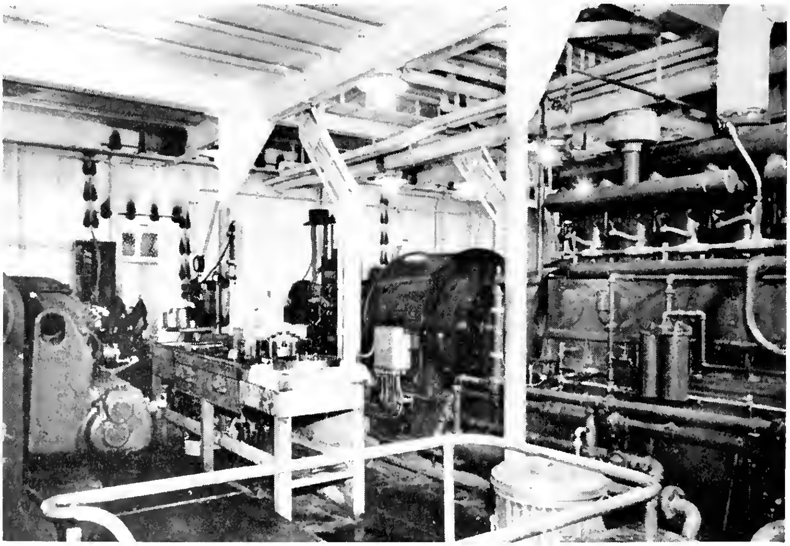
As additional insurance for clean fuel oil, a Winslow batch fuel filter, containing 14 elements, is installed between the main storage tanks and the engine day supply tanks.

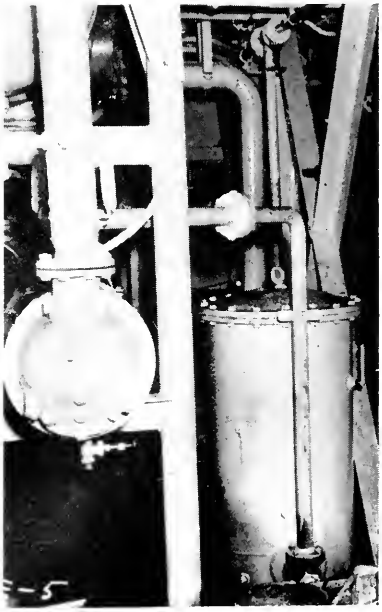
The engines are arranged in two rows athwartship four engines in a row. A Lorimer diesel engine driving a generator set is installed to provide power for lighting and for auxiliary machinery.

The switchboard and control apparatus is in a separate compartment.

A two-deck superstructure provides ample space for comfortable quarters for officers and crew.

The Electra is to be used as a power source for electric dredges, and is an excellent example of modern design and construction for this type of floating equipment.





Top of page: United States Army barge Electra, used as a power source for the operation of electric dredges, powered by eight 16-cylinder 2-cycle GM diesels. The barge has a total power output of 6000 kva.

Center: The auxiliary standby diesel is a Lorimer and is equipped with Winslow Dual Oil Conditioners.

Bottom: One of the eight Winslow Full-Flo Oil Conditioners installed to insure clean oil in engine bearings.

After sand blasting, shafts are thoroughly cleansed.

Sheet of synthetic rubber is wrapped around shaft.

RUBBER SHEATHED SHAFTS

By utilizing a special compound of synthetic rubber, U. S. naval forces have acquired an added margin of fighting efficiency. Naval authorities allowed it to be revealed recently that special coverings of the synthetic compound are being placed around the propeller drive shafts of cruisers, battleships, destroyers and escort vessels of all kinds.

The important new applications for the test tube rubber is made possible through the discovery of a method by U. S. Rubber Company scientists to successfully cure and bond the synthetic rubber solidly to the metal shafts.

The use of this new protective process prevents the pitting of the drive shafts through electrolysis, a condition which occurs when metal is immersed in salt water.

The new process, which is in operation at the U. S. Rubber Company, Los Angeles plant, enables the synthetic compound to be chemically welded to the steel shaft. Placed under tension, it is prepared for the vulcanization process.

The rapidly increasing demand for this new synthetic rubber application has compelled the rubber company to convert its shaft covering department into a training school. Trainees who have acquired the necessary skills are sent in crews to Pacific Coast shipyards where the work is done on the spot.

The method of application is very simple and is graphically shown in the illustrations herewith. An important point in the process is that the tape wrapping shrinks in the steam bath, thereby further tightening the rubber sheet on the shaft and assuring a perfect bond.

Left: Tape under tension is wrapped tightly around rubber sheet holding rubber in place.

Right: Shaft is placed in steam curing pit to vulcanize rubber.

WITH THE NAVAL ARCHITECTS

(Continued from page 71)

Static and Dynamic Testing of Structures

By F. G. Tatnall and C. H. Gibbons

This paper is all about the use of the SR-4 wire resistance strain gage in mass measurement methods both in static and dynamic tests. By these methods it is "possible to watch the entire development of stress under load through the various loading stages, first the elastic range, then the more interesting plastic range and on up to instability, buckling and failure, revealing completely the building up of areas of high and low stresses, like the high- and low-pressure areas on a weather map, locating and evaluating stress concentrations, and recording lightning-like progress of the load-deformation curve just preceding buckling or failure.

"It is possible to reinforce or alter the structure as the static test advances, using the stress distribution map which is developed as the test proceeds, so that design loads may be reached without failure of the structure. The data obtained by measurement can then be used to correct the design formulas and remove assumptions.

"With the gages still attached to the same structure or applied to a new structure based on re-design from test data, the structure may be given an accelerated life test dynamically by inducing high frequency alternating loads and vibrations with mechanical rotating eccentric weight oscillators, electrodynamic vibrators of the loud-speaker type, or structural fatigue machines. This investigates the fatigue strength of the structure as a whole, or resonant vibration conditions in members of the structure. It studies the amplification of resonant forces or the damping characteristics of the structure, the effect of fillets, changes in section, cutouts and holes or the effectiveness of welded and riveted joints under repeated stress of various magnitudes.

"Confidential work has been done on two ships, one a T 2 tanker and the other an E C 2 cargo ship for the Maritime Commission in determination of strain variation at numerous points under change of loading, from hog to sag conditions and vice versa and under hog and sag conditions combined with torsion of the ship's hull. At the same time facilities were provided for causing the ship to vibrate at its natural frequency and many readings were made of strain change under these circumstances.

"Some 300 electrical resistance wire strain gages were on one vessel and readings were made under many loading conditions so that the data finally summed up to some 10,000 values of strain. This mass of data is still under study and a formal report will not be forthcoming for several months at the earliest.

"It is well to know that extensive investigation has been made using these resistance wire gages in the problem of welding stresses both in small plate sections and in full-size sections; in one case the plate tested weighed 30 tons. There are at present eight strain recording elements on two ships at sea making a continuous record of strain change in the vessel under conditions met in regular service.

"Extensive use is being made of these gages at several shipyards in this country, notably at the Todd Houston and Bethlehem shipyards. Just what is being accomplished is partially shrouded in wartime secrecy."

The Quasi Wake Factor

By Professor E. M. Bragg

"The term quasi-wake factor is used to distinguish this quantity from the wake value ordinarily given on the data sheets of self-propelled model tests. The value of the latter quantity will vary, for the same original data, dependent upon the personal preference of the investigator for correlation between **two** sources of data, the test of the open propeller and the test of the self-propelled model, upon the basis of the Ct curves, the Cq curves or, as at the David Taylor Model Basin, an average of these two curves.

"The quasi-wake factor is a quantity which ties together the **three** sources of data, the open propeller test, the self-propelled model test and the test of the towed model."

The author gives considerable mathematical analysis of various factors in relation to model tests and design data of ships' hulls and propellers and shows many graphs, tables and curves based on this analysis. He comes to the conclusion that the quasi propulsive coefficient based on the quasi wake factor, "varies with the speed in any one test. This variation is apt to be greater with air foil blade section propellers than with those having ogival section blades, and greater in the case of twin screw vessels than in single screw vessels."

SHIPS AND MEN

(Continued from page 85)

posed to have been completed on November 11, 1918, was far from being completed.

The Maritime Commission, not to be caught napping, had carefully surveyed the rapidly expanding need for ships to carry food and munitions to hard-pressed England and her dwindling allies.

General Electric, Westinghouse, DeLaval, Worthington, and other established manufacturers of high-speed turbines and reduction gears were working around the clock turning out propulsion units for our fast expanding Navy and the Commission's standard type Cargo and Tanker Vessels now beginning to slide off the ways with increasing rapidity in shipyards all along our Eastern, Gulf, and Western Coasts.

The answer to the cry for more and more ships and a means of propelling them was the now famous "Liberty Ship," officially known as EC2-S-C1. The Liberty ship was a modification of an English tramp steamer which had been sailing the seven seas for the past thirty years carrying the British flag in and out of the far flung ports of the world.

The propelling machinery was the old reliable but slower reciprocating engine, familiarly known as the "Up and Downer."

Thus it will be seen we had a hull which was simple in construction, and with the rapid strides in the adoption of electric welding to ship construction, could be pre-fabricated, assembled, and constructed in what was then considered a remarkably

short period of time. The reciprocating type of engine could be produced in hundreds of small foundries and machine shops all over the country and final assembly could be effected at central points where needed.

This was only half the answer. 'Tis true we now had a vessel and the means of propelling the same which could be completed in less than half the time taken for the standard type of vessel.

The old line shipyards and those constructed since the beginning of the program had their ways and outfitting docks filled with the so-called "Long Range Program" vessels, so that new yards must be built and fast. Shipyards sprang up overnight. Mud flats, marshes and even hills were transformed into modern shipbuilding plants. Oregon Shipbuilding Corporation at Portland, California Shipbuilding Corporation at Terminal Island, California, and Permanente Metals Corporation, Yards One and Two, at Richmond, California, were soon ready to lay keels, and similar yards were constructed on the East Coast, Great Lakes, and Gulf Coast; and the greatest shipbuilding program in the world was on full blast.

The Liberty Ship Program officially started on March 14, 1941, when contracts were let for two hundred vessels. Shipyards on the Eastern Seaboard received 75 of these vessels, Gulf Coast Shipyards received 63, and the West Coast was allocated 62; and the Liberty Ship construction was on in full blast.

Bethlehem Fairfield laid the first Liberty keel on April 30, 1941, launched the vessel September 27, and delivered the first Liberty vessel constructed in the United States December 30, 1941—a total building time of 245 days. Not too much help here in building up our Merchant Marine.

Oregon Ship laid the first Liberty keel on the West Coast on May 19, 1941, launched this vessel on October 19, and delivered the first Liberty vessel from the West Coast December 31, 1941—a total building time of 226 days. A very creditable showing for a new yard and a warning to the Eastern Seaboard where shipbuilding was in full swing that they would have to look to their laurels.

Assembly line methods, fabrication of entire sections far removed from the ways were inaugurated, and overall construction time was rapidly reduced. Record after record was established, and immediately broken.

How this great record of shipbuilding miracles was shattered can best be shown by the following table:

Liberty Ship Program

Month	*Year*	*West Coast*	*Gulf Coast East Coast*	*Total for Country*	*D W T.*
December	1941	1	1	2	
January	1942	1	2	3	
February	1942	7	5	12	
March	1942	11	5	16	
April	1942	18	8	26	
May	1942	27	16	43	
June	1942	28	23	51	
July	1942	23	28	51	
August	1942	30	26	56	
September	1942	37	30	67	
October	1942	42	23	65	
November	1942	45	23	68	
December	1942	51	31	82	
Year Total		321	221	542	5,853,600
Percentage		.592	408		

Thus, in the first year after Black Sunday, December 7, 1941, the Pacific Coast, the forgotten child of shipbuilding, served notice on the country as a whole that it could build ships.

The year 1943 follows after the pattern set during the first year of the war:

	West Coast	*Gulf Coast East Coast*	*Total for Country*	*D.W.T.*
Year 1943	690	607	1,297	14,007,600

The year 1944 up to and including October 3, 1944, shows the following tabulation:

	**West Coast*	*Gulf Coast East Coast*	*Total for Country*	*D.W.T.*
Year 1944	159	452	611	6,598,800

*West Coast completed last Liberty vessel July 7, 1944.

Liberty Ship Summary to October 31, 1944

	West Coast	*Gulf Coast East Coast*	*Total for Country*	*D W T*
Year 1941	1	1	2	
Year 1942	320	220	540	
Year 1943	690	607	1,297	
Year 1944	159	452	611	
	1,170	1,280	2,450	26,460,000

MARITIME CONFERENCE

(Continued from page 83)

tention at this time to certain objectives and measures which will enhance the prospect of successful private operation.

1. We must reduce the cost of operation by increasing efficiency at sea and ashore. Generally speaking, it has been possible to maintain high wages and high standards of living in this country only because man hour output in our basic industries has been high in comparison with other countries. The same principle applies to shipping. The following measures will increase efficiency:

(a) Piers and other port facilities should be improved and modernized. Most European ports have been destroyed. In all likelihood they will be fully modernized when restored. Many American port facilities are greatly in need of modernization.

(b) All arbitrary "make work" practices and restrictions on individual output, both ashore and at sea, should be abolished.

(c) We must make the fullest possible use of labor saving machinery.

The first two items are particularly essential to a reduction of our loading and discharging costs, which sometimes run as high as 40 per cent of operating expenses.

2. We must plan for attractive accommodations and the finest possible service on our passen

ger liners if we expect to obtain and hold our post-war share of passenger traffic.

3. We must plan and provide for continued ship construction and modernization. It is essential that our American merchant marine be equipped at all times with modern and efficient vessels. Other nations are laying great stress upon the need for continued progress in ship design and construction. New vessels which they build to replace their war losses are likely to be more efficient than our war-built tonnage. British shipping interests are insistent upon the need for specialized vessels to serve particular trades and routes.
4. Transfers to foreign nations should be by sale rather than charter. If American operators invest their money in war-built tonnage, it is only fair to require that our foreign competitors do likewise. In such an event we shall have a parity of capital structure and competition will be on the basis of comparable vessels during the period of active use thereof.

It has been suggested in some quarters that this country should lease its tonnage surplus to foreign competitors on favorable terms, until such time as they can build themselves new tonnage. Since such new ships undoubtedly would be more modern and efficient than our own war-built tonnage, such a course obviously would be greatly to the disadvantage of American shipping.

In view of this country's contribution to the allied cause through its gigantic and expensive shipbuilding program, such a voluntary sacrifice of our own interest hardly seems called for.

5. We should strive for the restoration of private operation at the earliest moment consistent with military requirements. In the meantime, it seems highly desirable to protect our competitive position by freezing American vessels in their customary trade routes whenever possible, even though operations are still government account.
6. It is essential that any formula for the disposal of war-built tonnage to private operators take into account the necessity for capital structures which will permit profitable operations. While the prices fixed in H.R. 4486 may meet the needs of our foreign operators, I am quite sure that no one will contend that they are low enough to permit successful operation in the domestic trade.
7. Construction and Operating Subsidies must be continued as provided for in the Merchant Marine Act of 1936.
8. We must take every possible measure to provide American private operators with essential cargoes and a fair share of passenger business. To this end, the following steps should be taken:

(a) The unquestioned right of American steamships to engage in International Air Transport should be affirmed at the earliest possible date. The necessity of such action has been clearly established in a recent hearing before the House Committee on Merchant Marine and Fisheries.

(b) Private industry must be protected against competition by government - owned vessels which may be taken off the market and reserved for national defense purposes, and later restored to active service. It is unreasonable to expect private industry to risk its capital in the purchase and operation of ships unless it is assured of such protection.

(c) Government and military supplies should be transported in privately-operated ships insofar as may be practicable. There is no good reason why either the Army or Navy should continue to carry government supplies over commercial routes, in times of peace, provided that such supplies can be transported by privately-operated American ships at no increased cost to the government.

9. Deterrants to private investment in shipping must be minimized. There is a natural reluctance on the part of investors to risk their capital in a business unless they have freedom of initiative and judgment in the operation of that business. Government restraints and controls, which interfere with such freedom of action, should therefore be eliminated or at least minimized to the greatest possible extent.
10. Non - subsidized operators should be given encouragement for the creation of replacement reserves by tax relief and otherwise.
11. Jurisdiction over matters relating to shipping should be centralized and clarified. A recent survey shows that shipping must deal with one hundred and four different governmental agencies, committees and departments. Authority over some phases of shipping is either misplaced or divided among two or more agencies.
12. Finally, we must do everything possible to convert the present wartime enthusiasm for an adequate American merchant marine into practical peacetime support of our merchant fleets.

The job ahead calls for the same type of efficient teamwork by government, management and labor, which has made possible the magnificent wartime contribution of our merchant navy. To this tripartite team we must now add a fourth member—the American Public. As a result of the experience of this war, the public is finally aroused to the vital necessity of a strong peacetime merchant fleet. This wartime enthusiasm must now be translated into peacetime support for American-flag ships.

Running LIGHTS

WHO WHEN WHERE

Edited by B. H. Boynton

Left: Vice Admiral Emory S. Land, USN, Ret., Chairman of the U. S. Maritime Commission, speaking at the luncheon of the 18th annual meeting of both groups at the convention. Center: Session of the American Merchant Marine Conference. Right: The Hon. James V. Forrestal, Secretary of the Navy, speaking at the annual dinner.

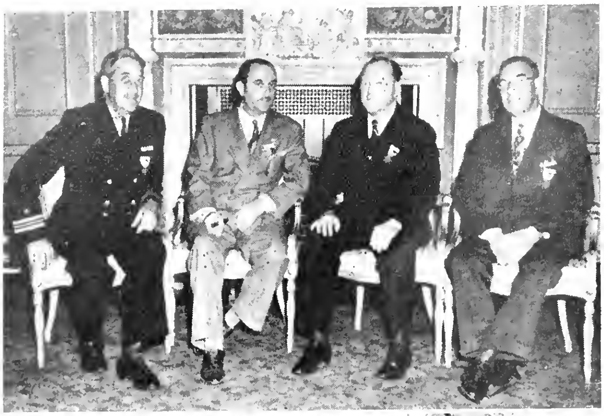
Scenes of the Eighteenth Annual Propeller Club National Convention

"What is the future of the American marine industry?" This question was the theme of the 18th annual meeting of The Propeller Club of the United States and The American Merchant Marine Conference held at the Waldorf-Astoria in New York, from October 18 to 20.

Key shipping and business men, representatives from the various ports throughout the Nation, attended the enlightening sessions, which included meetings and panel discussions, followed by the annual banquet at the close of the convention.

All in attendance agreed that this was the most important conference ever to convene.

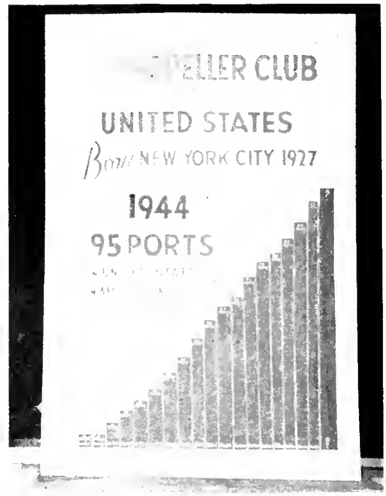
John F. Gehan assumes the national presidency of The Propeller Club of the United States at New York convention. (Left to right): C. H. C. Pearsall, past national president of club and vice president of the AGWI Steamship Lines; John F. Gehan, vice president of the American Export Lines, Inc.; Roscoe H. Prior, president of Port of Boston and chairman, national nominating committee; and Lt. Comdr. Harold J. Harding, USNR, national secretary of The Propeller Club of the United States.



Left: 1944-1945 National Officers (left to right): Lt. Comdr. H. J. Harding, USNR, national secretary; Arthur M. Tode, honorary president; John F. Gehan, national president; Joseph H. Godwin, national treasurer.

Lower Left: Luncheon tendered to the superintendents and members of the Board of Governors of the five State Maritime Academies of New York, Massachusetts, Pennsylvania, California and Maine.

Below: Scene of the entrance to conference chambers.



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Left: These five admirals attended the reception for Hon. James V. Forrestal, Secretary of the Navy, prior to the 18th Annual Dinner. Left to right: Rear Admiral J. W. Bunkley, USN, Ret., supervisor, New York Harbor; Vice Admiral H. F. Leary, USN, commandant, Eastern Sea Frontier; Vice Admiral Emory S. Land, USN, Ret., chairman, U. S. Maritime Commission; Rear Admiral W. R. Munroe, USN, commandant, Third Naval District, and Rear Admiral S. S. Kennedy, USN, manager, U. S. Navy Yard, New York.

Right: Partial view of Head Table at luncheon tendered by the Women's Organization for the American Merchant Marine, Inc., to visiting ladies at convention. Left to right: Lt. Col. Harold G. Hoffman, guest speaker, former Governor, State of New Jersey; Mrs. Arthur M. Tode, past president of WOAMM, and chairman of the Ladies Committee; Mrs. Emory S. Land; Mrs. B. C. Edwards, president, WOAMM; Mrs. C. H. C. Pearsall, past president, WOAMM; and Mrs. Walter N. Ingram, chairman, Program Committee.

Bilge Club's Fall Stag Party on Navy Day

Left: Around this table at banquet we recognize Jimmie Dean of Dean & Hoffman, marine agents; R. H. Cyrus of Union Oil Co. of Calif. Al Meyers, sales engineer of Craig Shipbuilding Co., Joe Hare of WSA, John Craig of Craig Shipbuilding Co., Frank Cavanough of West Coast Shipbuilding Co.; and (standing) R. G. Vandenboom, president of Union Marbelite Co.

Right: See if you can recognize yourself or friends at this round table.

Hundreds of members of Los Angeles Harbor's Bilge Club met in gleeful mood on Navy Day, October 27, for its annual fall stag banquet at the smart Pacific Coast Club in Long Beach, California. A full program of exceptional food and entertainment climaxed the greatest and most glorious Navy Day in Southern California history.

Present for the epochal event were a whole tableful of former Bilge Club presidents, including Captain Theodore Peters of the Standard Oil Company, who came all the way from his new station in San Francisco to attend the autumn meeting.

President T. W. Buchholz presided, with Secretary Bob Snodgrass assiduously assisting. No formal speeches or other serious business interfered with the joyous festivities. The occasion was declared the best party put on by the Bilge Club since its last summer's annual barbecue.

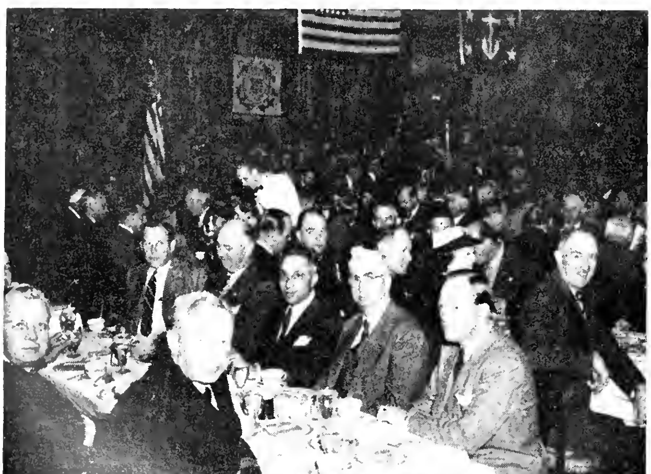
Upper right: Officers and directors of Bilge Club, who lined up for PMR's photographer, include W. A. Harrington of Bethlehem Steel; T. W. Buchholz of Metropolitan Stevedoring; W. S. Rash, California Bank; Howard Hartry, Custom House broker; Bob Snodgrass, Elks Club; Earl Archibald of Sunset Oil; Floyd Nelson of Texas Company; and R. W. (Duke) Decker of San Pedro Tow Boat Co.

At right: Among the past presidents of Bilge Club attending the annual fall banquet were, port to starb'd, Joseph M. Costello, Lloyd Moore of General Petroleum, Tom Forster of Bethlehem, Dan Dobler of Texas Oil, John Eidem of Hancock Oil, and Captain Theo. Peters of Standard Oil Co.

Speakers' table at Los Angeles Biltmore luncheon, when the Navy League of the United States, the Propeller Club and other civic organizations heard an inspiring message from the Honorable Ralph H. Bard, Undersecretary of the Navy. (Mr. Bard is wearing spectacles, seated to left of the KFI-NBC banner.)

Others at the table include LeRoy M. Edwards, toastmaster; the principal speaker; Morgan Adams, regional vice pres. of the Navy League who was Chairman of the Day; Brig. Gen. Gerald C. Thomas, U. S. Marine Corps, who was the other speaker.

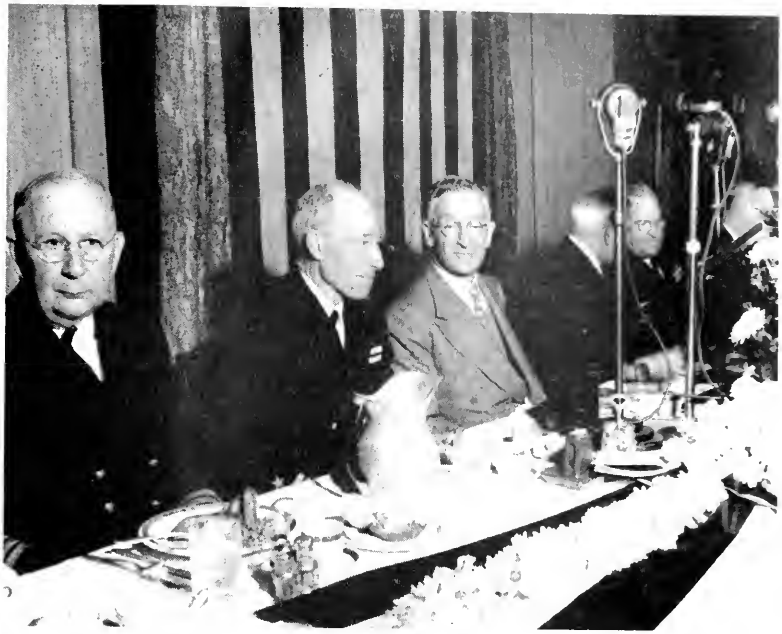
Los Angeles Celebrates Navy Day



Above: Another view of the speakers' table during luncheon with Lieut. Jimmie Greer, USCG, and his orchestra in the background.

Left, above: The gentleman in uniform is Capt. John Oliegreen, senior port pilot, L. A. Harbor Dept.; on his left, E. J. Brandreth, administrative officer, WSA; across the table, extreme left, J. G. (Jim) Craig, of Craig Shipbuilding Co.; Don E. Montague, v.p. and g.m., R. C. Griffith Co.; Joe M. Costello, pres. of the J. M. Costello Supply Co. and past pres. of Bilge Club; O. J. Higgins, port eng. American Mail Lines (S. F.); and Rolf Monsen of the Todd Shipyards Corp.

Left: In this group are E. J. Baird, Waterfront Employers Assn.; his son, Ensign Jim Baird, USN; Wm. R. Marlowe, WEA; M. A. Richley, formerly with McCormick S. S. Co.; Miss Margaret Bridges, asst. to the Propeller Club's secretary, H. W. Woodruff of Williams, Dimond & Co.; Fred A. Hooper of American-Hawaiian S. S. Co.; and Herb Pickering, partner of W. H. Wickersham & Co.



Portion of speakers' table: left to right, Comdr. Charles Beardsley, USNR (ret.), who introduced guest speaker Rear Admiral Carleton H. Wright, commandant, 12th Naval District; Adrien J. Falk, pres. S. F. Chamber; Mayor Roger D. Lapham (behind mike), and Vice Admiral David W. Bagley, commander, Western Sea Frontier.

Navy Day in S. F.

Admiral Wright Speaker

Coincident with one of the greatest naval victories in American history, San Francisco celebrated Navy Day, October 27, with Rear Admiral Carleton H. Wright as principal speaker. He described the difficulties encountered in the Pacific as compared to the Atlantic war, pointing out that in the invasion of France it took only on overnight run for the invasion craft, whereas in the Pacific, speaking of the invasion the previous week, took a round trip of upward to five months for each load of supplies and men . . . and the Pacific is no mill pond!

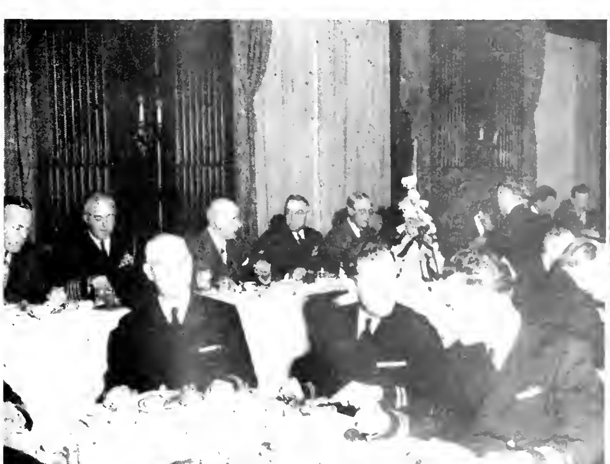
Admiral Wright's naval career includes extensive and active duty in the Pacific theater. He was awarded the Navy Cross for his participation in the November 30, 1942 engagement off Guadalcanal as commander of a task force. He also took part in the first landings on the island and in the Battle of Santa Cruz.

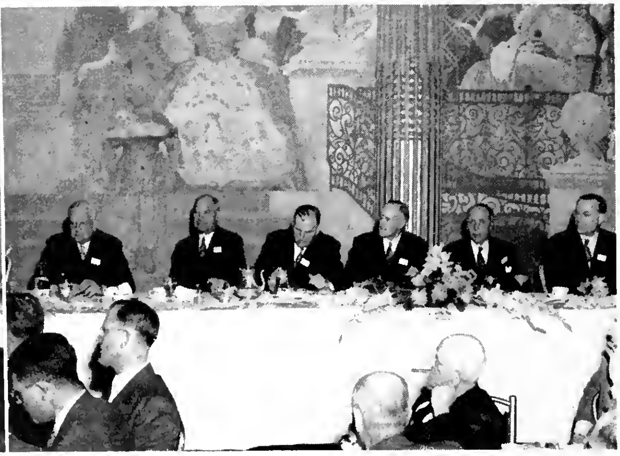
Commander Charles A. Beardsley, USNR, (ret.) Northern California Chairman of the Day, introduced the speaker.

Mayor Roger D. Lapham and Major General Charles H. Bonesteel paid tribute to the Navy.

Above: Hon. Roger D. Lapham, mayor of San Francisco, and Vice Admiral David W. Bagley, Commander, Western Sea Frontier.

Below, left: Glimpses of the head table. Right: we see Marshall Dill, Commodore B. C. Allen, Elmer G. Johnson, Major Gen. Chas. H. Bonesteel, Hon. Thomas Rolph, congressman from 4th District, San Francisco, Vice Admiral John W. Greenslade.





Left to right: W. O. Olin, S. F. traff. mgr. U.P.R.R.; Howard Chase, dir. of pub. rel., General Mills; Stanley Pedder, pres., Emeryville Chem. Co.; Dr. Edwin G. Nourse, Brookings Inst.; Adrien Falk, pres. of S. F. C. of C.; Wm. Jeffers, pres. Union Pacific R. R.; Chas. E. Moore, pres. Joshua Hendy Iron Wks.; Roger Laphom, Mayor of S. F.; L. R. Campiglio, pres., C & H Sugar Ref. Corp., Ltd.; Chas. L. Wheeler, exec. v. p. of McCormick S. S. Co.; Wil Evans, v. p., Calif. Container Corp.; Everett R. Smith, dir. of research, McFadden Pubs.; Stuart Ward, secy. of Commonwealth Club.

Public Relations An Executive's Business

That sound public relations policies were never so important as they are today and that executives, of all persuasions, are profoundly interested, was indicated by the attendance at the series of conferences, held in Pacific Coast cities during October, by the National Industrial Information Committee of the National Association of Manufacturers. Speakers of national prominence addressed packed meetings at all sessions.

The principal guest and speaker at the Los Angeles and San Francisco meetings was W. M. Jeffers, president of the Union Pacific Railroad Company, who took as his theme, "A New Philosophy of Postwar Management." Jeffers indicated impatience with executives who depend on subordinates to maintain relations with the public and their employees, and blamed such second-hand contacts for the misunderstanding — or lack of understanding — which both groups have for business and concluded, "If you sit so long in one place and get frozen in, don't yell about it. That is what is so bad in some of the situations that are developing in this country. Now you men sit around your clubs, you sit around a bridge table, and you do the damndest job of converting each other that anyone ever heard of. Now you have influence, or should have. Try to sell the man on the street; try to sell your employee, that

Charles E. Moore, president of Joshua Hendy Iron Works, and NAM director.

this is a great country; that this is a great form of government, and that you don't want to see it changed and neither does he. I think it is accurate to say that so far as Russia is concerned communism is definitely on its way out and capitalism, as we know it, is on its way in. Unfortunately we have too many people in this country who still think communism is on its way in, in America. Now it is your job and my job to halt that type of thinking. We want friendly relations with our allies. Russia has done a great job, but I think you will agree with me that we don't want communism in this country and if we get it, it will be because you men who have influence and fail to exert that influence haven't done your job, or done it well."

The San Francisco series was presided over by Charles E. Moore, president, Joshua Hendy Iron Works and Northern California director, N. A. M. Edwin G. Nourse, vice president, The Brookings Institution, Washington, D. C., and Everett R. Smith, Director of Research, Macfadden Publications, Inc., New York, also expounded on the importance of direct contacts with employees, not only for the sake of a more efficiently managed industry but because the opinion of the general public is very often based on the opinion formed by the employees.

President Donald B. Tresidder, of Stanford University, dwelt on the danger to free enterprise of a constant dependence on government and others for routine assistance. He stated that every element in the population had formed the habit of running to Washington for help and that universities were setting a bad example in that regard. But the point was not missed by manufacturers, railroad and steamship executives and others present that the trend toward supporting the paternalistic system of government was a sure means of undermining the American system.

Charles L. Wheeler, executive vice president, Pope & Talbot, Inc., and McCormick Steamship Co., developed "Avenues of Approach to Corporate Postwar Problems". Representing two of the West Coast's major industries, Wheeler, a spark plug in both, presented down-to-earth ideas for every other type of industry as well.

Marine Exchange's Eventful Year

The murals by John Stoll—part of an exhibit on the floor of the Marine Exchange, San Francisco. These murals depict liberty ships in heavy going —at left in the South Atlantic, at right in the South Pacific. They will be hung in the new headquarters of the Sailors Union of the Pacific at San Francisco.

During the eventful year now coming to a close the Marine Exchange of San Francisco has been more active than at any time in its history.

It has gained increasing prestige as the west's outstanding maritime association. The scope of its activities, under the direction of the Navy, and in cooperation with the Army, Coast Guard and other government agencies, surpass those of any similar organization in the country.

During the year recognition of the importance in our local maritime picture of the many manufacturers and suppliers of machinery, equipment and services, was given by the appointment of John Parker, President of the American Marine Paint Co., to the board of directors of the Exchange.

Over one hundred new members were added to the Exchange roster during the year. Those recently admitted to membership include:

- American Marine Fumigating Co.
- Anchor Brass Works
- The Coca-Cola Co.
- John Demartini Co.
- General Motors Corp. (Cleveland Diesel Engine Division)
- George T. Gerhardt Co., Inc.
- Capt. F. Hawkesworth
- Ingram-Parsons Co.
- Capt. Fred C. Klein
- Mundet Cork Corp.
- J. R. O'Donnell Co.
- Pacific Sales and Equipment Co.
- Harry W. Parsons, Inc.
- Neil H. Peterson Co.
- Plant Rubber and Asbestos Co.
- Seale & Thompson
- Port of Stockton
- Capt. S. J. Stangeland
- Paul Steffen
- Todd Shipyard Corp.
- A. R. Tooker
- W. H. Wickersham & Co.
- Capt. H. W. Wiemers

General Activities

With other groups the Exchange participated in staging luncheons for Roger Lapham, an Exchange stalwart and Mayor of San Francisco, and for Almon E. Roth, president of the American Federation of Shipping. Other luncheons commemorated National Maritime Day and Navy Day.

The Exchange also participated in a Coast Guard Celebration, honoring the Volunteer Port Security Regiment of which Commander Roy C. Ward, president of the Exchange, is commanding officer. Commander Ward, vice president of Cosgrove Co., has given all his time without pay to organizing the regiment and directing its many activities.

Numerous exhibits were held on the Exchange Floor, most recently the newly completed John Stoll murals that are to be placed in the new quarters to be erected by the Sailors Union of the Pacific. Admirals Bagley and Jones, Col. Mellom, Mayor Lapham, Commissioner Bufano, and many others were present when Harry Lundberg, president of the Sailors Union, unveiled the murals.

Other exhibits displayed were a large number of ship models, a shipbuilders exhibit, another depicting Sea Scout activities, invasion tactics, and the Central Valley project.

During the week of Harbor Day in August, a large maritime exhibit was arranged and displayed in the Ferry Building. Estimates of the attendance there are as high as 100,000.

Radio Programs

The Exchange has actively encouraged popular interest in shipping to bring about a better understanding in the public mind of the basic importance of shipping in the bay area's contribution to the war effort as well as in its future economy. For this reason it has encouraged various exhibits and the publication of such booklets as the one prepared by the Pacific Marine Review and published by the Junior Chamber of Commerce, of which over 5,000 copies were distributed. This booklet demonstrated the amount of money ships [illegible] spend in the bay area ports, and the large percentage for wages.

Beginning [illegible] Marine Exchange Day [illegible] (when [illegible] three [illegible] were [illegible] the [illegible] officials [illegible] Frazer A. B[illegible] J. M[illegible] and [illegible]

The Exchange hopes that more of these radio programs, with both union and steamship officers participating, can be staged in the coming year.

Foreign Trade Zone

During the year Thomas E. Lyons, executive secretary of the Foreign Trade Zones Board, visited San Francisco and two luncheons were tendered him to which interested parties were invited to come and ask questions.

Wide publicity given by the Exchange to the advantages of establishing a zone in the bay area has aroused interest on the part of the Henry J. Kaiser organization at Richmond, the Port of Redwood City, and others.

World Trade Center

Fifteen trustees, appointed by the Chamber of Commerce, established the World Trade Center, Inc., early in the year. The Marine Exchange manager is secretary to the board of trustees.

The project has been endorsed by the leading chambers of commerce in the bay area and several state-wide groups such as the State Farm Bureau and the Dairy Council.

The trustees have drawn up extensive plans covering costs, income and amortization, and have several sites under consideration.

It is probable that the trustees may announce concrete plans sometime in the spring of the coming year.

Bay Area Maritime Committee

Although this committee, of which the Exchange manager is secretary, is now only in its third year it has succeeded in establishing itself solidly in the endeavor to promote bay area cooperation.

Among the many subjects in which it has interested itself are the resumption of coastwise, intercoastal and inland waterway transportation, the preparation of a postwar program of bay area channel improvements, a system of airports, the diversion of ships to other ports because of the lack of repair facilities in the early part of the year, the preparation and publication of area-wide port statistics to replace those currently published separately as for San Francisco and Richmond, coordination of the activities of the area's congressional representatives in Washington, D.C., and of its assemblymen and senators in Sacramento.

The committee helped to secure the establishment in San Francisco of a bay area office of the State Reconstruction and Re-employment Commission. This is designed to aid in area coordination for postwar activities.

The committee will play an increasingly important part in the postwar resumption of shipping in this area. It can bring to bear the influence of the twelve counties of the area, all of which are ably represented on the committee.

Prospects for 1945

The Marine Exchange proposes to do all it can to facilitate the handling and dispatch of the large shipping coming to the San Francisco bay area.

To this end it shall continue to work for the improvement of shipping facilities, increased efficiency in cargo handling, the establishment, as soon as postwar conditions permit, of a foreign trade zone, the building of a World Trade Center, a wider recognition by the two million inhabitants of the bay area of the importance of shipping and the resumption of coastwise service.

In the carrying out of this program the Exchange invites all those indirectly as well as directly interested from a business standpoint to submit proposals or suggestions for consideration by the board of directors.

Compensation

The War Shipping Administration has agreed to pay the United Fruit Company $2,150,000 for the loss of four of its prewar ships, through enemy action while in war service, under bareboat charter to the Government. The sum recommended by the WSA covers all claims by the owner, including allowance for actual loss through delay in payment, in accordance with rules of the Advisory Board on Just Compensation appointed by the President.

These steamships, all under American flag registry, were the Metapan, Parismina, Tivives and Sixaola, all built at Belfast, Ireland, 1909-1911. Deadweight tonnages range from 4081 to 4911. Each had 13-knot speed and the Sixaola had accommodations for 97 first class passengers.

Payment of $428,333, plus loss due to delay in settlement, to Agwilines, Inc., of New York City, for the loss of its prewar Clyde-Mallory liner Henry R. Mallory, which was sunk by torpedo with heavy loss of life early in 1943, has been authorized by the WSA.

This cargo passenger liner of 5730 deadweight tons was built in 1916 by the Newport News Shipbuilding and Dry Dock Co.

Payment for two passenger vessels which for many years were familiar to peacetime travelers of the Potomac River and Chesapeake Bay, but which are now in war service, has been fixed at $338,275, the WSA announced. They are the Northland and Southland, owned by the Norfolk and Washington Steamboat Company, but requisitioned for title by the WSA and now operated by the Navy.

Hee Haw!

That the traditional army mule is still a very important requisite — especially for fighting over muddy and mountainous terrain—was noted when the War Shipping Administration recently announced the allocation of 17 vessels to the War Department for use as mule carriers.

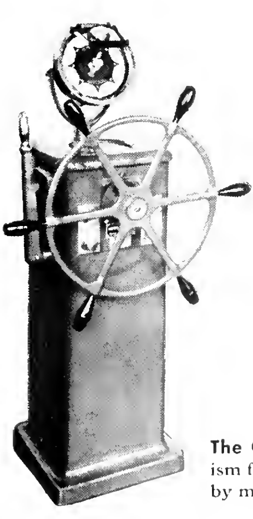
Conversion to mule carriers has been completed on 15 of the 17 ships and the other two are expected to be ready soon. Thirteen Liberty ships and four other cargo vessels are the complement destined to carry mules to various theaters of war.

Cost of conversion averaged $317,133 for each vessel and mule accommodations vary from 320 regular stalls and 16 sick bay stalls to 699 stalls with 32 for sick bay use. Quarters are also provided for 86 to 125 men.

Stalls are built crosswise of the ship as experiments prove that mules transported in this manner do not suffer from seasickness. Provisions were also made for changing the size of the stalls to fit mules from different parts of the country—as the mules bought in Missouri are usually larger than those obtained in Texas.

WSA officials pointed out that the vessels could readily be reconverted to their original condition as comparatively little structural alterations were involved in providing the changes necessary for carrying the Army's four-legged beast of burden.

There is economy in this wake



The Gyro-Pilot control unit contains the mechanism for automatic steering, and for manual steering by means of the pilot wheel.

THE STRAIGHT-AS-A-DIE wake that Metal Mike leaves behind when he steers a ship is the sign of a Sperry Gyro-Pilot on the job.

Many hundreds of ships of all types—cargo, troop, tanker—are steering straighter courses toward the fighting fronts because of the Gyro-Pilots with which they are equipped.

Metal Mike applies only small rudder angles at the right split second—day in and day out. This means maximum economy.

Also, Metal Mike contributes to safety, by providing a complete electric telemotor system entirely independent of, and paralleling, the ship's hydraulic telemotor.

The watch officer on the bridge has, within easy reach, means for quickly changing from automatic steering to Gyro-Pilot hand steering or to the hydraulic telemotor.

For maximum economy, be sure to include the Sperry Gyro-Pilot in the specifications for your new ships.

Sperry Gyroscope Company
INC

GREAT NECK, NEW YORK • DIVISION OF THE SPERRY CORPORATION

GYROSCOPICS • ELECTRONICS • RADAR • AUTOMATIC COMPUTATION • [illegible]

President Promotes Vickery to Vice Admiral

President Roosevelt, with the confirmation of the Senate, has promoted **Rear Admiral Howard L. Vickery,** vice chairman of the Maritime Commission and constructor-in-chief of its shipbuilding program, to the rank of Vice Admiral, U.S.N.

While recuperating from a short illness in the Naval Hospital at Bethesda, Maryland, Admiral Vickery was notified of his new rank. Notification of the promotion and delivery of the Presidential parchment was made by Vice Admiral Emory S. Land, the Commission's chairman, during the first part of November.

At left:
Vice Admiral Howard L. Vickery.

Admiral Ingersoll Commands Western Sea Frontier

The United States Navy's top hand in antisubmarine warfare and the transporting of troops and supplies arrived in San Francisco, November 17, to do for the Pacific theater what he had done in the Atlantic.

Admiral Royal E. Ingersoll, son of an admiral, recipient of the Distinguished Service Medal for his outstanding work in helping win the battle of the Atlantic, took up his desk work in the Federal Building. Doing so, this four star admiral relinquishes his official title of commander-in-chief of the Atlantic Fleet, and in return, has taken on the new dual responsibility of assistant to Admiral Ernest J. King as deputy chief of naval operations and deputy chief of the United States Navy.

As commander of the Western Sea Frontier, Adm. Ingersoll relieves Rear Admiral David W. Bagley, who goes to Pearl Harbor to assume command of the Hawaiian Sea Frontier.

Swan Island Welders Champs

Swan Island welders at the Kaiser tanker-building shipyard in Portland, Oregon, on September 19 defeated a welding team from the Jones Construction Company from Brunswick, Georgia, in a contest that gave the Swan Island two-welder team a total of 638.86 points to outclass two Georgian welders who totaled 630.05.

High honors went to the Swan Island woman member of the team, Miss Joy Wilson, 21-year-old ex-telephone operator, who scored 325.82 points out of a possible 350 points to defeat Mrs. E. M. Bolding, woman member of the Jones team, who scored 312.41 points. In a close contest, V. C. Gambrell of the Jones contingent defeated the male Swan Island contestant, S. Colbert, 317.64 points to 313.04 points. Miss Joy Wilson took high honors among the contestants.

Each test plate was judged separately. Records were kept of amperage used, electrodes used, time, number of stubs burned, and number of passes. Each welder was required to complete five test plates: overhead butt weld, vertical butt, horizontal fillet, overhead fillet, and vertical fillet. Contestants were allowed time to adjust machines, try out equipment and become accustomed to the welding booths.

Top: Welding champions from Kaiser-Swan Island Yard. Miss Joy Wilson and S. Colbert.

Right: V. C. Gambrell and Mrs. E. M. Bolding, welding champions from the J. A. Jones Construction Company in Brunswick, Georgia.

Commodore Philip F. Roach, Coast Guard commanding officer in the 12th Naval District, presents the Coast Guard's Security Shield of Honor to Vice President J. L. Hanna of the Standard Oil Company of California during ceremonies in front of the Standard Oil Building in San Francisco. Shown on the presentation platform are (left to right), Mr. Hanna, Vice Admiral John L. Greenslade, USN, Commander P. B. Cronk, Coast Guard Captain of the Port for the 12th Naval District, Commodore Roach and Colonel John P. Rhett, from Army's Western Defense Command.

Hot off the Press

"Fasteners," catalog F, by the Cleveland Cap Screw Company, covers cap screws, set screws, aircraft bolts, nuts and other fastener items. The catalog is thumb indexed for convenient reference, and contains complete lists of dimensions and weights. It lies flat when open.

• • •

The B. F. Goodrich Company is distributing a four-page folder on V-Belts, featuring information about the recently announced wire grommet type.

• • •

Dresser Manufacturing Company of Bradford, Pa., has published an attractive bulletin (Form 4418) on bulkhead seals, describing the two types of watertight seals for pipes running through bulkheads.

• • •

Manufacturers Screw Products of Chicago have issued a Handy Stock Record in folder form, listing a record of "in-stock" aviation and commercial fasteners of every type and description to keep buyers abreast of the firm's stock condition.

• • •

Adjusto Feeders is the title of Bulletin No. 1100 by Proportioneers, Inc., of Providence, R. I., showing the specific application of the firm's equipment in many fields. Adjust-O-Feeder pumps, of diaphragm and plunger types, are fully described, and complete details of their dimensions and capacities are included.

• • •

Space-saving flexible couplings described in a bulletin by Farrel-Birmingham Company, Inc., are designed for applications where a close-coupled connection is necessary or desirable. By bolting the coupling flange directly to a flywheel, brake drum or similar component, complete flexibility is provided between driving and driven units in half the space occupied by an ordinary coupling.

• • •

The new apparatus bulletin issued by Victor Equipment Company of San Francisco and Los Angeles is published with the purpose of conveying to the user a pictorial impression of the excellence of the welding and cutting equipment and how it may serve him best.

"How to Repair Dies," the title of another Victor Equipment Company booklet, shows how to repair dies and tool steel with Eureka electrodes. Approximately 250 illustrations with text show how to apply water-hardening, oil-hardening, air-hardening or hot-working electrodes, and how to prepare and weld dies and other tool steels.

• • •

Industrial haulage vehicles are presented in a handy vest-pocket catalog including specification data on every model of Tructractor. It has been released for distribution by Clark Tructractor Division of Clark Equipment Company, Battle Creek, Michigan.

• • •

Ideal Commutator Dresser Co. of Sycamore, Illinois, has published a catalog on machine tool accessories which includes the "A-C" magnetic chuck, "Triple Duty" live centers, electric tachometers, grinding wheel dresser, etc. The catalog includes specifications of each accessory and concise descriptions.

• • •

A new 25-page booklet on Westinghouse Power Centers shows the compact, coordinated unit substations available in all standard ratings for quick installation in war plants, shipyards, hospitals and other industries.

• • •

The Baker Industrial Truck Division of The Baker-Raulang Company, Cleveland, Ohio, has released a catalog (No. 52) helpful to any plant or warehouse faced with transportation problems.

• • •

"Combustion Control, Type P," title of a catalog by Leeds & Northrup Company, Philadelphia, Pa., describes the system of combustion control designed especially for smaller industrial or municipal power plants and shows how the system regulates fuel-feed and draft by a simple electrical balance, varying the settings of valves, dampers, or vanes in definite proportion to steam demand.

• • •

A new marine pump bulletin, covering a complete line of bilge, ballast, circulating fire, general service and sewage pumps, has been issued by the Chicago Pump Co., and includes considerable application information, installation layouts and sample specifications.

• • •

Greene, Tweed & Co. has published a bulletin (F-10) on the Favorite Reversible Ratchet Wrench which graphically describes the principal features of the tool and clearly shows how it is designed and used. Complete data on the dimensions of the sizes, which cover nuts for all standard square and hex bolts, are included.

• • •

The Story of a New Ship of War, the L.C.I.(L)) as built by the New Jersey Shipbuilding Corporation, is the title of a booklet put out by the Todd Shipyards Corporation, which is a pictorial presentation of the "Ugly Ducklings" that capture the beachheads.

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The manufacturers named in this HOT OFF THE PRESS department will gladly furnish, without obligation to you, copies of the trade literature reviewed in these pages. For quick service, please use this coupon.

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500 Sansome Street - - - San Francisco

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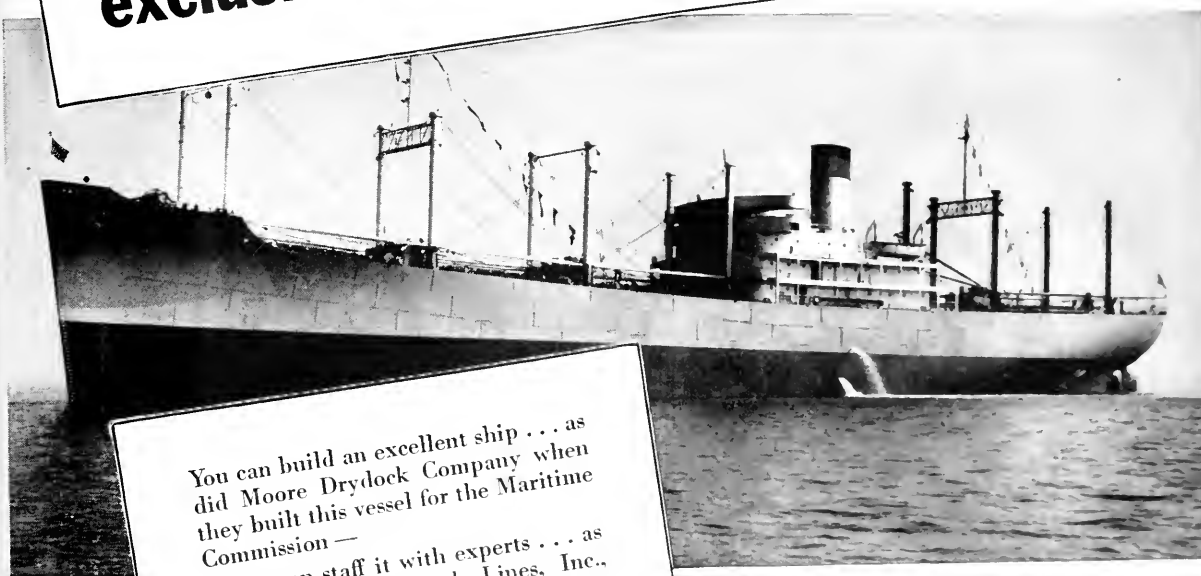
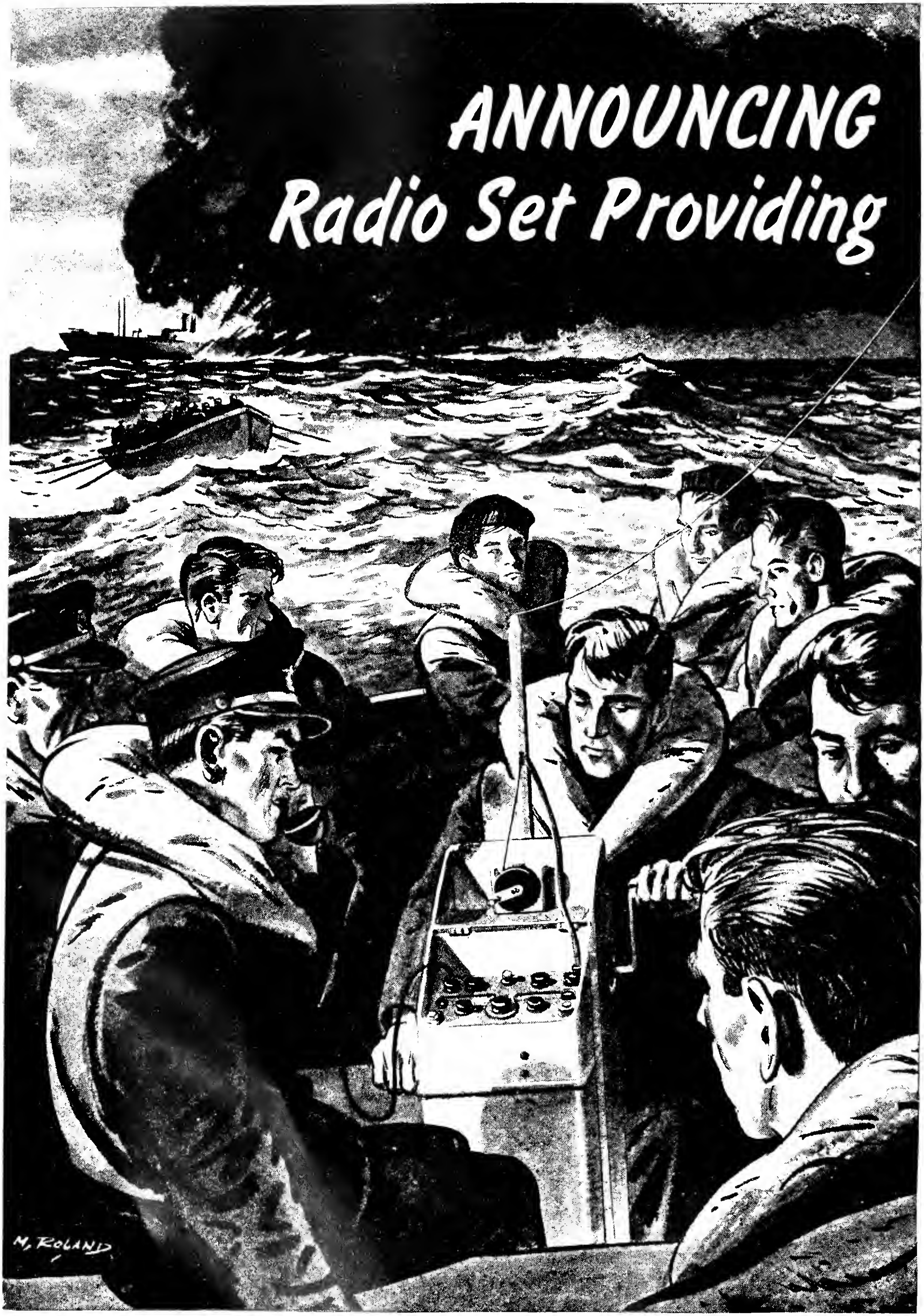


SS MORMACSEA: only Army vessel to be cited twice as a "superior" ship on basis of performance


ANNOUNCING
Radio Set Providing
M. ROLAND

RADIOMARINE

develops an entirely new, more powerful and complete set, easily operated by any crewman

MARINE electronic engineers are saying this new Radiomarine unit is the last word in life-saving equipment. Unlike present lifeboat radio sets, it consists of a radio receiver and transmitter for both voice and code communication. Also, it is completely self-contained and housed in a water-tight binnacle, permanently installed in the lifeboat. The set is, thus, always ready for use in a few minutes.

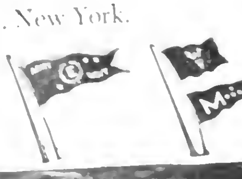
The two-way radiotelephone feature of this set adds to its simplicity and flexibility, enabling any unskilled person to transmit and receive messages.

This Radiomarine set has other advantages. It is rugged, buoyant and drench-proof. No batteries are needed. It is powered by a built-in, hand-driven generator.

Long range communication is assured by the use of both intermediate and short-wave frequencies and the use of an efficient balloon or kite supported aerial. The set automatically transmits SOS signals alternately on both intermediate and short wave frequencies, and may be used to communicate with other lifeboats and with ships or shore radio stations.

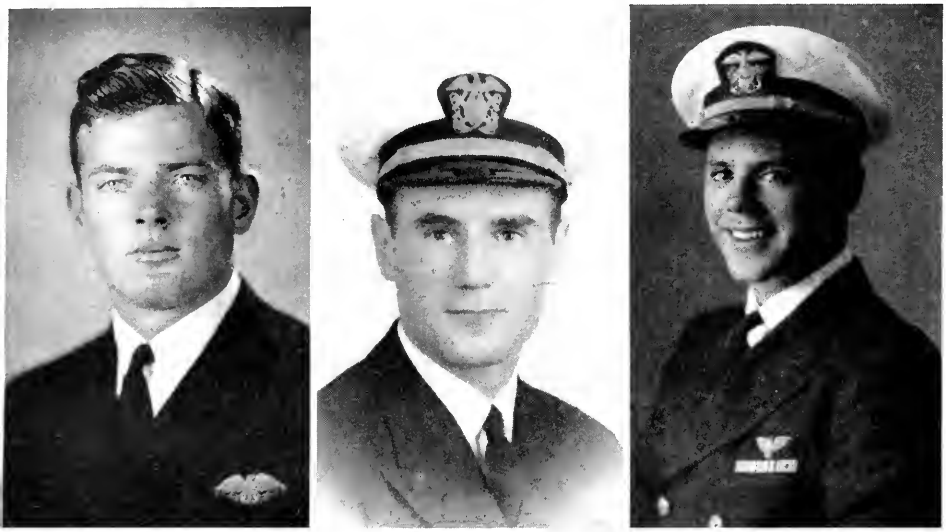
* * *

This Radiomarine unit was designed in co-operation with the U. S. Maritime Commission experts. Its development is another example of Radiomarine leadership in creating and improving radio-electronic equipment for greater safety of life at sea. Radiomarine Corporation of America, 75 Varick Street, New York 13, New York.



RCA RADIOMARINE CORPORATION OF AMERICA

A SERVICE OF RADIO CORPORATION OF AMERICA



Left to right: Kenneth Allan Hulme; Lieut. James F. Demarest and Lieut. R. C. Demarest, sons of Captain R. O. Demarest of San Francisco.

The Bay Area is Proud Of These Boys

We want you to know about these three Bay area men: **Kenneth Allan Hulme,** son of Allan K. Hulme, vice president of General Steamship Corp., Ltd., San Francisco; and **James F.** and **Raymond C. Demarest,** sons of Captain R. O. Demarest, marine superintendent of Sudden and Christenson, San Francisco.

Kenneth Allan Hulme is chief officer on a troopship operating in the South Pacific, under the Mississippi Shipping Company's flag.

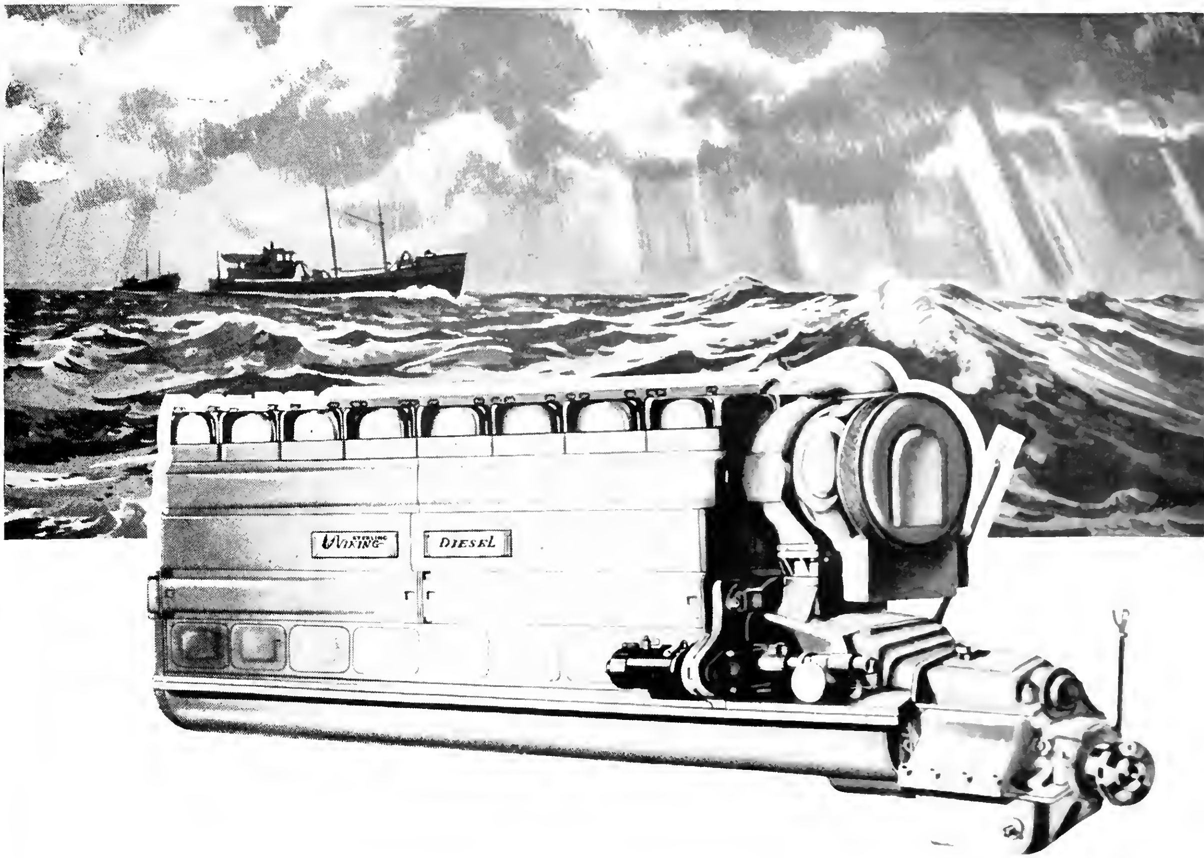
Before joining the merchant marine he was well known around the bay as a clever yachtsman. He graduated from the California Maritime Academy in July, 1942, and although he had passed the examination for a second officer's license, he had to wait for it until his 21st birthday in February, 1943. During this interim he secured a good groundwork in ship construction while working as a ship's draftsman in the Moore Shipyard in Oakland.

He had made many trips to the South Pacific as second officer, on different vessels of the Mississippi Shipping Company, before his present assignment as chief officer.

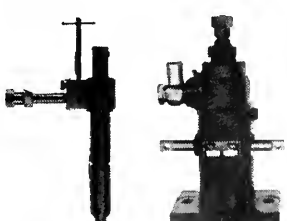
Lieutenant James F. Demarest, USNR, has recently returned from the Pacific war zone where he spent about 18 months on a submarine as engineer officer.

On graduating from the University of California in February, 1943, he transferred to the U. S. Navy Submarine Training School at Portsmouth, N. H., and in the following June, shipped to Perth, Australia to join his ship. He is now senior engineer officer on the submarine Tuna.

Lieutenant Raymond C. Demarest, USN, is now a flying instructor for the U. S. Navy Air Corps at the Banana River Air Base in Florida. During the past 18 months he has served in the Iceland patrol, then to England, and followed by the North African invasion and Mediterranean theatre.



THE NEW STERLING "VIKING" DIESEL HAS BENDIX-SCINTILLA FUEL INJECTION EQUIPMENT



FUEL INJECTION PUMPS are available for a wide range of engines. NOZZLE HOLDER ASSEMBLIES are available in a variety of lengths, with replacement spray tips. Also, liquid-cooled units interchangeable with uncooled units.

The new Sterling "Viking" Diesel marks a new advance in design, in horsepower per pound, in compactness and in fuel economy.

That explains the choice of Bendix-Scintilla Fuel Injection Equipment. For Bendix-Scintilla Fuel Pumps and Nozzle Holder Assemblies are outstanding for their efficient, dependable, economical operation. They are precision-built with the ruggedness to withstand heavy-duty service. Their simple design (reducing maintenance and service to a minimum), rugged construction, and careful workmanship give unfailing dependability.

For further details on Bendix-Scintilla equipment, or for the answer to your fuel injection problems, write to the Scintilla Magneto Division.

SCINTILLA MAGNETO DIVISION

SIDNEY, N. Y.

THE INVISIBLE CREW
Precision Equipment by
Bendix
Aviation Corporation

Consultant On Reconversion Problems

Captain A. B. Court (USN, retired) recently announced the opening of offices in the Russ Building, San Francisco, as consultant on problems of management, production, contract termination and reconversion.

Captain A. B. Court (USN, Ret.)

Captain Court has just concluded two years active service as Inspector of Naval Material in the San Francisco district. Prior to this, he was executive vice president of the Los Angeles Shipbuilding and Drydock Company. His work in the Navy included three years settling cancelled contracts after World War I, many years in charge of industrial work at major Navy Yards and in supervising plans, purchasing, and construction for the Navy at such major private yards as Federal Shipbuilding Company, Bath Iron Works, and Bethlehem Steel Company. In 1935, he was loaned by the Navy to the Shipping Board to study comparative costs of shipbuilding in Great Britain, Norway, Sweden, Denmark and Holland.

He is a member of the American Society of Naval Architects and Marine Engineers, and a graduate both of the United States Naval Academy (Annapolis) and of the Massachusetts Institute of Technology.

Steward and McEwing Open Pacific Marine Surveys

Launching a new survey service in San Pedro, D. K. Steward and H. E. McEwing have organized a company known as the Pacific Marine Surveys, to function as representatives for shipping companies, operators and insurance companies on surveys of voyage and damage repairs to hull and machinery, to draw up specifications, place work orders, expedite and follow through to completion all repairs and/or betterments ordered.

Mr. Steward formerly was chief engineer of the Texas Oil Company and for the past four years supervising engineer of Westinghouse Electric and Manufacturing Company, has installed all Westinghouse C-1 and Victory Ship main propulsion equipment in Southern California, as well as the Westinghouse turbo-generator sets on C-1's and escort vessels.

Mr. McEwing was formerly chief engineer and surveyor for the old Shipping Board, assistant port engineer for the I. M. M. Lines in New York, chief engineer for Los Angeles Steamship Company, and, recently, assistant superintendent engineer for the Los Angeles Tanker Operators, Inc., and with the California Shipbuilding Corporation as general superintendent of machinery until early 1944.

Hough & Egbert Have Services of Steward & McEwing

Hough & Egbert Co., consulting engineers and marine surveyors in San Francisco and San Pedro, announce that they have services of David K. Steward and H. E. McEwing, as consultant marine engineers, through their San Pedro office.

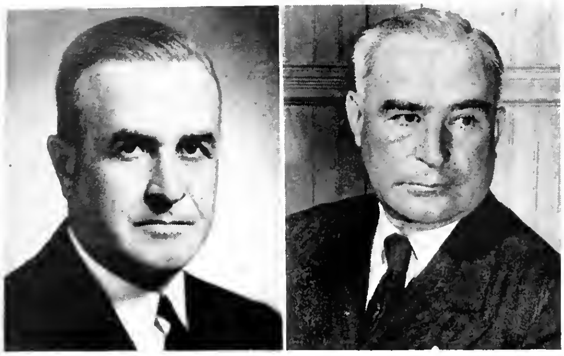
"M" Award

In recognition of outstanding production for the construction of new ships for the Victory Fleet, the Torrance Works of Columbia Steel Company, a U. S. Steel subsidiary, has been awarded the Maritime "M" Pennant.

Obituary

Philip L. Bannan

Philip L. Bannan, Sr., president of Pacific Gear and Tool Works of San Francisco, and president of Western Gear Works, Lynwood and Vernon, California and Seattle, Washington, died in San Francisco on October 8. Death followed a month's illness, during which time he underwent an operation from which he never recovered. He was 72 years old.



Left: James B. Black, of San Francisco, newly appointed member of the Board of Directors of the United States Steel Corp.

Right: James L. Dunn, recently appointed Vice President in charge of Industrial Relations, Jenkins Bros.

Jenkins Bros. Promotes James L. Dunn

James L. Dunn, assistant plant manager of the Bridgeport plant of Jenkins Bros., manufacturers of valves and rubber products, was elected by the board of directors on September 14 to the post of vice president in charge of industrial relations, according to announcement by Farnham Yardley, president. Mr. Dunn has been associated with the company since 1913.

Frank W. Quicke, veteran West Coast oil man, has recently been promoted to Manager of Lubrication Sales of Richfield Oil Corp. He was formerly manager of commercial sales for Richfield.

Pacific Marine Review
500 Sansome Street
San Francisco 11, California

Gentlemen:

The Naval Aviation show has brought many people to this Museum—many of whom have never been former visitors. We feel that this exhibition has been an important event for the public of San Francisco and we are extremely satisfied with the response to it.

May I take this opportunity to thank you—and will you also please convey my thanks to Mr. De Rochie—for the excellent article and illustrations which you carried on the show. Your enthusiastic cooperation with the Museum in publicizing the exhibition was one of the most important factors in the success of our publicity program.

The Museum appreciates the interest which you have taken, not only in respect to this particular exhibition, but in many of our past exhibitions and activities.

With many thanks,
Sincerely yours,
Dr. Jermayne MacAgy,
Director,
The California Palace of the Legion of Honor.

Stan Allen Promoted

Lieutenant Commander **Stanley E. Allen** has been awarded the Legion of Merit. He has also been recommended for advancement to rank of commander. He is well known in shipping circles and one of the founders of the Propeller Club of California now the Mariners Club. At the outbreak of the war he left the marine department of Standard Oil for service.

Stationed as the Security Officer in charge of port protection at Aruba-Curacao, Port Amsterdam, Willamstad, Curacao, N. W. I., "Sea" Allen, as he was affectionately known during the years he served as secretary for the Mariners Club, was given the citation for exceptional meritorious conduct in the performance of outstanding service in the furtherance of the war effort of the United Nations.

Shoreside Personalities

"Bill" Dickie Retires

After 38 years of service in the hull division of the drafting room at Mare Island Navy Yard, **W. S. Dickie,** supervisor of ship drafting, retired on November 30. Some 175 present and former employees of the yard gathered at the farewell dinner held for him at the Plaza Hotel, Napa, California, on October 28.

W. S. Dickie, oldest son of George W. Dickie of the famous Union Iron Works, shipbuilders, was born in San Francisco in 1875. He served an apprenticeship as loftsman and naval architect at the old Union, and worked as a draftsman there under Hugo Frear. In 1906, he joined the drafting staff at Mare Island.

"Bill" has always been interested in the young draftsmen coming into the yard and his friendly counsel and guidance has been of great value in the training of these men.

His experience bridges the period between sailing ships and modern liners, and with his pals and fellow employees, we join heartily in the greeting that decorated the cover page of the dinner meu:

"Smooth Sailing, Bill!"

Wm Dickie

That art untouched by softness, all that line
Drawn ringing hard to stand the test of brine......
That art of masts, sails crowded, fit to break,
Yet stayed to strength and backstayed into rake.....
by John Masefield

R. H. Fenkhausen who, for the past forty years, has ably executed his duties as plant engineer for the Union Iron Works in San Francisco, retired on October 31.

Late last month **Ronald McDonald,** assistant secretary for the U. S. Maritime Commission, was on an inspection trip to the West Coast, meeting with Carl W. Flesher, director of Maritime Commission's ship construction, and with other executives. While here he met with Eugene "Gene" Hoffman for the first time since they spent their early boyhood in a small Pennsylvania town.

Fred L. Doelker, president of The Propeller Club of the United States, Port of San Francisco, upon returning to his office from the 18th annual National Convention held in New York, said this was the most important and successful conclave held by the organization.

Every steamship company in the nation, both ocean and inland, was represented. Vice Admiral Emory S. Land represented the Government as chairman of the U. S. Maritime Commission. Virtually every allied industry of shipping as well as the shipbuilding industry had representatives present.

C. D. Allen was recently named transportation sales engineer in the Pacific Coast area for the Baldwin Locomotive Works, with headquarters in San Francisco, and is now renewing acquaintance with business associates located here.

"Tiny" Hardesty Now Comar President

E. E. "Tiny" **Hardesty** is now president of the Coast Marine Engineering Corp., of 900 W. Broadway, Long Beach, California, an association of naval architects, marine engineers and ship's draftsmen and manufacturers of the "Comar" watertight non-weld electrical terminal tube.

Two new members of the corporation are Ernest E. Belcher, director, and Charles E. Perry, vice president. Perry was formerly with the Consolidated Steel Co., and more recently with Philco where he was assistant director of research.

C. W. Eliason, industrial relations head on the Pacific Coast for the U. S. Maritime Commission for the last two and one-half years, resigns effective December 31. He is becoming associated with a Detroit industrial concern.

The attractive new site of The William Lee Company at 1401 Third Street, San Francisco.

Lee K. Vermille of Overton, Lyman & Plumb of Los Angeles district, new president of The Propeller Club of the United States, Port of Los Angeles-Long Beach, recently returned to the West Coast from New York City where he attended the 18th annual National Convention of the club. While there he was elected regional vice president of the Propeller Club for the southern part of the Pacific Coast.

Commander Paul B. Cronk, captain of San Francisco Port, was recently succeeded by Commander William H. Yost.

William Lee Company's New Quarters

The William Lee Company recently moved into spacious new quarters at 1401 Third Street, San Francisco, specially designed to suit the requirements of the trade.

Bill Lee has been identified with the marine covering and painting business in San Francisco for over thirty-six years. Emil Halonen, the manager, who has been with the company for many years, is also well known on the waterfront.

Since October 1941, when the company commenced work on the Maritime Commission EC-2 vessels' contract at the Permanente Metals Corp. Richmond plant, they have continuously endeavored to improve their methods of laying deck coverings, which has contributed considerably to the record ship production at that yard. Perfect delivery schedules were maintained on over 350 Liberty ships, in spite of the company's heavy manpower losses to the armed forces.

The company is now chiefly engaged in ship repair and maintenance work in the various repair yards in the bay area.

Gustin - Bacon's Pacific Coast Division

In February, 1943, the Gustin-Bacon Manufacturing Company, with home offices at Kansas City, Missouri, and branches in New York, Chicago, Houston, Philadelphia and Tulsa, officially opened their San Francisco branch, with offices at 111 Sutter Street, under the management of Harry M. Green.

By July of this year the company's operations had developed so extensively as to require larger quarters and additional personnel.

Working with Mr. Green as an engineer and special service representative is Charles W. Gilmer, who joined the Pacific Coast Division in June, 1943.

The San Francisco office has been servicing the shipbuilding industry on the Coast with flexible pipe couplings of two kinds: the Rolagrip type, which is used on plain-end pipe and eliminates grooving and welding; and the Gruvagrip coupling, which is a type requiring grooving of the pipe. Segweld pipe fittings, either steel or wrought iron, are available for both types of flexible couplings, and also are designed for welded, flanged or thread-coupled pipe systems.

These products are exclusively distributed to the marine industry on the Coast by the Petroleum Equipment Co., maintaining branch offices and warehouse stocks in Seattle, Portland, San Francisco and Los Angeles.

GUSTIN-BACON'S SAN FRANCISCO PERSONNEL

Left to right: Chas. M. Gilmer, engineer and service representative; Miss Evelyn Bergsten, secretary and administrative assistant; Miss Pat Connell, stenographer and receptionist; Harry M. Green, manager, Pacific Coast division.